Illinois 158 Outer Belt Feasibility Study

Final Report Appendices

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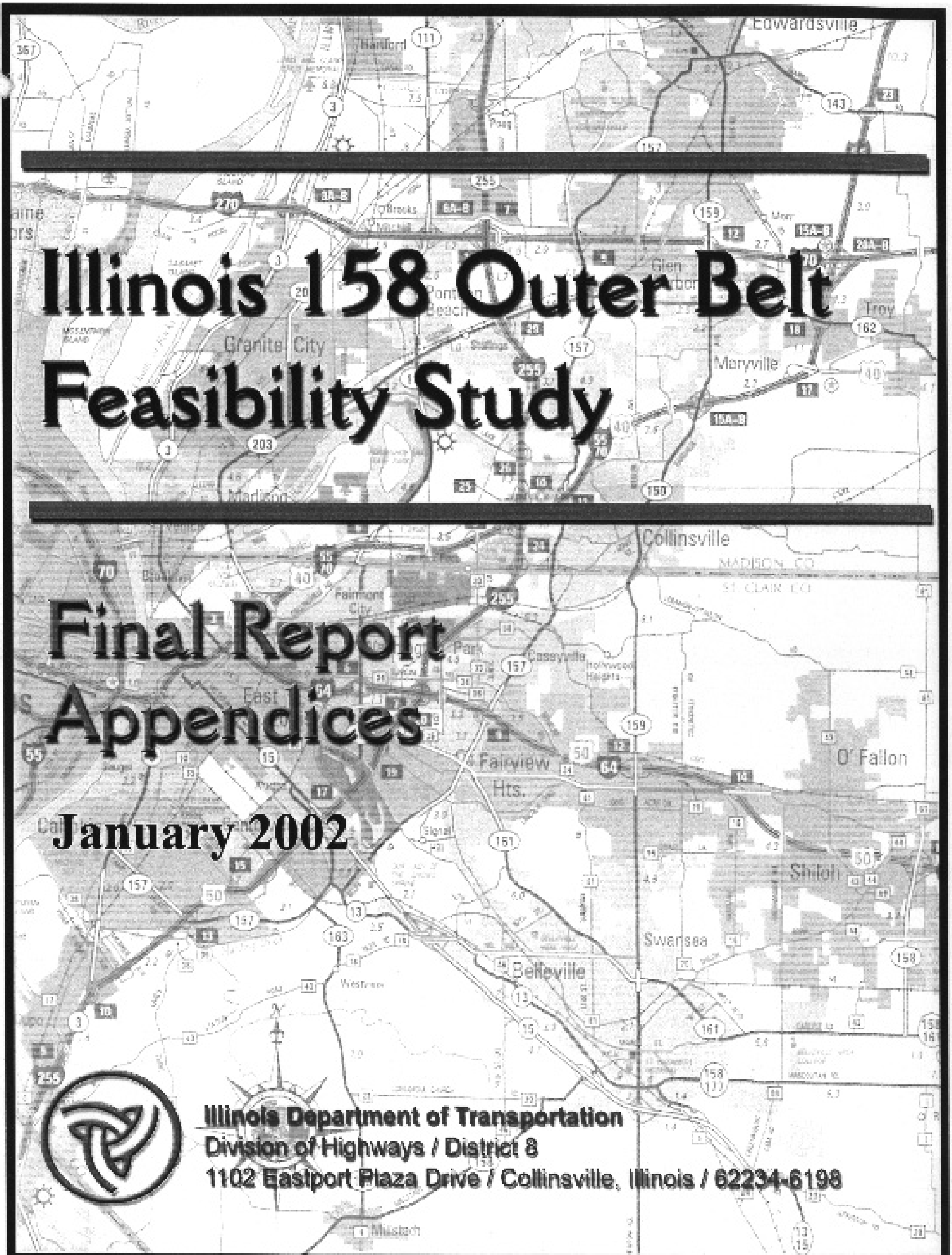

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A.1 ENVIRONMENTAL ANALYSIS

1. BACKGROUND

The IL-158 outer belt corridor extends from the I-55/I-70 and US-40 interchange at Troy in Madison County on the north, south and west through St. Clair County, to the I-255/US-50 and IL-3 interchange near the Jefferson Barracks Bridge in Monroe County. The project corridor is located within three counties in southwestern Illinois: Madison, Monroe and St. Clair. Monroe and St. Clair counties have unique geological and ecological features, particularly west of Millstadt, Ill., which could have a significant impact on the final routing of IL-158 and cost of construction. The area that contains these unique features is locally known as the Sinkhole Plain. A specific routing has not been established at this time, due to ongoing input from local communities. Relevant environmental and community concerns within the project corridor will be the focus of this report.

This environmental analysis was based on a review of available literature, federal and state databases, and field reconnaissance studies. Photographs from the field reconnaissance studies can be found in Appendix A.

2. AFFECTED ENVIRONMENT

2.1 Physical Characteristics

Construction and operation of the proposed IL-158 outer belt highway could have an impact on the geology, hydrology, and water quality within the project corridor. The unique geologic and hydrologic features in the Sinkhole Plain area of the project corridor are of particular concern and will be reviewed in detail.

2.1.1 Soils

The soil in Illinois was originally formed from loess, or windblown silt, after the last glaciers receded. The layer of loess in the Sinkhole Plain region (west of Millstadt) is, in some places, 20 feet thick. This is much thicker than in the rest of the state. While it is true that more land is used for farming in the Sinkhole Plain than for any other single purpose, a smaller proportion of land is farmed in the Sinkhole Plain when compared to the state as a whole, due the varied topography.

Although loess is extremely fertile and readily cultivated, it is also highly erodible. As a result, it essentially becomes a water pollutant when it is carried to area streams, lakes and ponds. The bottom of the lower Kaskaskia, normally.packed with sand and gravel, becomes layered with silt as the result of soil erosion. This silt, once buried, can be as much as one-foot deep.

Since the 1980s, the amount of erosion from fields has decreased due to the decrease in the amount of acreage devoted to row crops, as well as the conversion of the most readily eroded land to government-paid 'conservation reserves'. Area farmers have also employed best management practices in an effort to decrease soil erosion. Despite the fact that the topography in the Sinkhole Plain leaves the soil prone to erosion, by 1997, six of ten acres of the area's farmland were loosing soil no faster than it was being replaced by nature (IDNR, 1999).

In addition to fertile soil, the region also has limestone bedrock that is crushed and sold to the construction trade and it is also used as raw material for agricultural lime. This represents a significant natural resource within the region (IDNR, 1999). Prime and Important soils found within the project area are shown in Table 1.

Table 1
Soil Types within the IL-158 Extension Study Area in Southwest Illinois

PRIME	CLASS	IMPORTANT	CLASS	NOT PRIME	CLASS
36B Tama Silt Loam	IIe-1	280C2 Fayette Silt Loam	IIIe-1	8F2 Hickory Loam	IVe-1
41A Muscatine Silt Loam	I-1	280C3 Fayette Silt Loam	IVe-1		
61A Atterberry Silt Loam	I-1	308C2 Alford Silt Loam	IIIe-1		
280B Fayette Silt Loam	IIe-2	308C3 Alford Silty Clay Loam	IIe-2		
280B2 Fayette Silt Loam	IIe-2	308 D2 Alford Silt Loam	IVe-2		
308B Alford Silt Loam	IIe-1	280D2 Fayette Silt Loam	IVe-2		
333 Wakeland Silt Loam	IIw-3	386C2 Downs Silt Loam	IIIe-1		
454A Iva Silt Loam	IIw-2				
454B Iva Silt Loam	IIw-1				

Source: IDOT December 29, 1997 Memorandum

2.1.2 Geology

The project corridor runs through a unique geological setting characterized by the presence of heavily karstified regions in the Sinkhole Plain (Figure 1). The term karst was originally used to describe a limestone plateau in the Yugoslavian Alps that was characterized by the presence of sinkholes, caves, sinking streams, and springs. The term is currently used to describe 25% of the earth's surface that is characterized by highly soluble bedrock such as limestone or dolomite, beneath a thin layer of soil. The all-inclusive term 'terrane' is generally used to describe all the surficial and subsurficial features of a karstified region, which includes sinkholes, sinking streams, underground (cave) streams and springs (Korab, 1999). All of Monroe county, most of St. Clair county, and portions of Madison county are contained within the 1,228 square mile Sinkhole Plain located in southwestern Illinois. It is estimated that there are as many as 10,000 sinkholes in southern St. Clair, Monroe, and northern Randolph counties: these sinkholes can reach a depth of 25 feet (IDNR, 1999).

Sinkholes are formed when acidic rainwater and snowmelt travel through the soil profile, eventually dissolving soluble bedrock such as limestone. This creates cracks and fissures in the bedrock, creating a labyrinth of cavities that serve as a direct conduit from the soil surface to the groundwater or aquifer below. This direct connection between the surface and groundwater accelerates the rate at which water travels from the surface to groundwater, often on the order of thousands of feet per day (Ozark Underground Lab, 1995). In other words, in the Sinkhole Plain water can flow distances within a few hours that would typically take days or weeks in areas that are less porous.

The Sinkhole Plain can be broken down into two major karst areas in the project area: the Salem Plateau and the Mississippi River basin. The Salem Plateau karst area is located from northwestern Jackson County through most of Randolph and Monroe Counties and the western portion of St. Clair County (Taylor & Webb, 2000). Only a very small portion of this karst area falls within the most southern tip of the project area. The Mississippi River Basin karst area is a band that is about 65 miles long and between 12 to 15 miles wide. It runs roughly parallel to the Mississippi River from near Cahokia and Dupo in St. Clair County southward to the southeastern border of Randolph County. In Monroe County, karst areas extend eastward to within about two miles of the Kaskaskia River in the panhandle portion of that county.

There are 142 known caves in the Sinkhole Plain. Major caves include Fogelpole Cave, Illinois Caverns, Stemler Cave, Dry Run Cave and Krueger Cave, which are connected to the Stemler Cave system (IDNR, 1999). Many of these caves contain unique ecosystems that serve as habitat for threatened or endangered species. These ecosystems are extremely sensitive to fluctuations in light, pH, temperature and humidity.

2.1.3 Hydrology

Groundwater and surface water features in the project area are shown in Figures 2 and 3. The unique geology of the area has created unique groundwater and surface water characteristics within the proposed project corridor.

Groundwater

In the Sinkhole Plain, groundwater is as vital a resource as coal or limestone. Groundwater reservoirs are the remains of ancient river valleys that were left behind when the glaciers receded. In some cases, sand and gravel layers were formed on these ancient riverbeds up to 90 feet thick. Underground water has been trapped and held in the fissures and cracks of bedrock and it has subsequently been tapped to supply water to towns such as Collinsville and Edwardsville. The majority of residents in rural communities in the Mississippi River Basin karst area obtain their drinking water from private wells that tap water from the karst aquifers. Locations of known private wells in the project corridor are shown in Figure 2.

An interesting feature of the sinkhole plain area is that the direction of groundwater flow is often different than it is for surface flow. In addition, one recharge area may contribute water to multiple spring systems located, in some cases, in different topographic basins (Ozark Underground Lab, 1995).

Surface Water

The project corridor falls within the Lower Kaskaskia watershed and contains a number of creeks, small lakes and ponds (Figure 3). There are no major rivers within the project corridor and most of the creeks that run through the area are tributaries to Silver Creek and Richland Creek. The proposed route crosses several of the tributaries to Silver Creek, the main stem of Richland Creek, Douglas Creek at two different locations, Palmer Creek, and Hill Lake Creek (Route 15 to Interstate 255).

There are roughly 2,380 miles of streams, 340 lakes, and numerous smaller lakes and ponds within the Sinkhole Plain. Additionally, there are a variety of backwater and bottomland lakes, precipitation-filled sinkholes, as well as water-filled pits and ponds that were formed as the result of mining activities (IDNR, 1999).

Much of the land within the Sinkhole Plain is used for agricultural purposes. Draining farm fields diverts water to nearby streams, resulting in increased flow rates. Water that was previously held within the soil column is no longer available to feed streams slowly. As a result, droughts that formerly caused a mere decrease in stream flow rates now cause these streams to completely dry up. During periods of low rainfall, streams such as Richland Creek are fed primarily by effluent from sewage treatment plants (IDNR, 1999).

According to an IDOT memorandum (Dec. 29,1997), "the 158 extension would cross Loop, Richland and Sugar Creeks. In-stream work would be necessary. None of the creeks is listed as a Class I Stream". The project area has changed since this memo and other tributaries of Silver Creek are also located within the project.

The USGS maintains gages on Richland (05595200) and Silver creeks (05594450). The Richland Creek gage is near Hecker, Ill. in St. Clair County. This creek is part of the Lower Kaskaskia watershed and has a drainage area consisting of 129 square miles located above the gage station. The Silver Creek gage is near Troy, Ill. in Madison County. This creek is also part of the Lower Kaskaskia watershed and has a drainage area comprised of 154 square miles located above the gage station. Based on USGS gage data for these two creeks, they experience considerable variation in flows. As shown in Table 2, monthly mean streamflows vary from less than 1 cubic foot/second (cfs) to over 800 cfs in Silver Creek near Troy and from less than 9 cfs to over 1,300 cfs in Richland Creek near Hecker. This variation is further emphasized by data on peak flows for these two streams as shown in Table 3. Peak streamflows since 1985 have frequently exceeded 5,000 cfs for Silver Creek and 6,000 cfs for Richland Creek.

2.1.4 Water Quality

Issues of water quality are

extensive areas of sinkholes and caves. There is a greater risk of groundwater contamination from pollutants that are spilled or dumped on the surface in the Sinkhole Plain due to the direct link between surface water and groundwater via sinkholes, sinking streams and underground cave streams and springs.

The most common pollutants in this area include discharge from septic systems, highway runoff, and pesticide and fertilizer runoff from agricultural fields (IDNR, 1999). Without sufficient soil filtration, contaminants enter groundwater systems directly through fractures and conduits (including cave passages). Once contaminants enter surface or cave streams, and wells and springs in karst areas, they may be extremely persistent in spite of the high flow rates of groundwater through these systems (PELA, 1995). Contaminants such as suspended and dissolved solids, heavy metals, nutrients, bacteria, road salt, herbicides, and hydrocarbons from highways are transported to groundwater systems through stormwater runoff. Hydrocarbons from the incomplete combustion of gasoline or from oil that has dripped onto roadways, or that has been improperly disposed of, may likewise enter storm drains (Aspluind *et al.*, 1980, Latimer *et al.*, 1990, as cited in PELA, 1995).

During the period from 1986 to 1991, the Monroe-Randolph Bi-County Health Department tested 2,689 private wells in Monroe and Randolph counties for the presence of total coliform bacteria (Ozark Underground Lab, 1995). In 1985, thirty-six percent of the wells tested contained water that was deemed unsafe for drinking; by 1995, the proportion rose to 75%. Studies in other karst areas have linked increases in coliform bacteria with increased development (Hobbs1992, Hoey 1976 as cited in Taylor & Webb, 2000). The growing number of houses built in rural areas means an increased risk of contaminating shallow-lying groundwater with coliform bacteria from poorly maintained septic systems. In Monroe County, for instance, there was a 269% increase in the number of building permits issued between 1983 and 1993. This county contains three-fourths of all the sinkholes in the Sinkhole Plain (Korab, 1999).

Table 2
Mean Monthly Streamflow Data (cubic feet/second) for Silver and Richland Creeks

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Silver Creek near Troy in Madison County, Illinois												
1985	269	537	362	387	38.5	272	13.0	37.3	.96	.66	331	373
1986	15.6	428	40.6	16.7	6.28	27.5	96.3	1.60	2.29	165	19.2	67.8
1987	54.0	106	84.5	148	10.4	1.72	21.1	6.28	3.84	1.56	16.5	358
1988	156	416	207	59.1	5.34	.91	1.51	4.23	.093	.36	69.9	39.0
1989	115	33.0	234	193	27.3	8.51	2.27	11.4	26.9	4.47	9.81	2.02
1990	5.30	69.3	65.9	125	809	161	9.54	8.64	2.29	41.6	34.7	340
1991	279	309	206	169	56.9	48.3	221	4.78	5.78	9.06	39.5	37.5
1992	30.5	28.6	57.6	101	13.8	3.12	11.7	5.38	6.58	1.53	108	143
1993	495	107	329	519	171	40.0	82.0	22.4	408	90.6	500	189
1994	259	168	36.8	738	174	40.3	5.85	2.02	2.02	3.43	77.4	22.1
1995	292	128	280	33.3	827	97.9	17.3	117	2.03	1.73	2.49	11.1
1996	153	18.2	23.8	482	513	78.5	70.3	4.15	1.51	2.10	137	50.3
1997	143	426	259	51.2	47.0	37.1	4.54	10.1	4.59	1.86	3.34	13.5
1998	73.3	119	528	281	156	501	146	296	19.2	7.48	79.5	9.80
1999	257	638	125	181	102	147	65.6	2.53	1.02	3.25	1.73	4.46
2000	3.17	29.2	16.6	13.4	60.7	457	454	222	69.7	ND	ND	ND
Mean	162	223	178	219	189	120	76	47	36	22	95	111
Richland Creek near Hecker in St. Clair County, Illinois												
1985	137	428	267	206	49.0	146	32.0	30.2	11.1	15.3	516	159
1986	29.6	488	62.8	26.7	27.6	65.6	25.6	23.8	149	270	37.7	82.0
1987	65.9	64.1	129	87.6	31.3	18.2	151	45.6	26.1	12.6	62.5	582
1988	170	309	198	67.0	18.4	15.0	47.7	12.9	21.0	10.5	104	30.7
1989	109	55.1	289	246	58.0	59.1	19.6	15.9	72.0	23.3	20.5	11.0
1990	32.3	132	47.2	136	648	102	17.2	11.9	10.5	15.9	65.4	188
1991	163	203	185	182	41.5	25.4	118	13.4	20.3	50.8	75.5	70.7
1992	58.6	73.0	116	149	25.8	83.1	84.2	26.0	33.7	10.3	122	88.4
1993	271	82.4	229	158	290	135	251	106	471	78.5	446	161
1994	146	85.0	55.0	751	132	68.7	44.8	16.6	12.9	17.1	80.4	34.3
1995	130	70.0	230	72.0	1306	218	30.4	17.5	8.82	9.53	14.4	30.1
1996	67.0	20.2	28.1	736	178	171	76.1	28.2	16.0	14.4	119	61.0
1997	190	320	192	69.7	38.8	155	33.0	33.9	15.1	16.8	22.3	36.3
1998	86.7	112	369	217	99.9	227	192	271	15.1	19.3	51.3	26.3
1999	298	378	176	150	113	105	45.9	21.6	9.84	10.2	10.4	16.4
2000	15.6	22.8	20.1	20.4	84.0	430	160	83.6	26.9	ND	ND	ND
Mean	123	178	162	205	196	127	83	47	57	38	116	105

Source: USGS Monthly Streamflow Statistics for the USA, 2001

ND – No Data

Table 3
Peak Streamflow Data (cubic feet/second) for Silver and Richland Creeks

WATER YEAR	SILVER CREEK	RICHLAND CREEK
1985	5,490	5,820
1986	5,450	8,410
1987	1,410[1]	3,110
1988	4,530	4,750
1989	1,870	5,200
1990	9,170	9,970[1]
1991	3,500[2]	4,700
1992	546[1]	2,590[1]
1993	3,330	9,020
1994	5,830	8,970
1995	6,960	13,700
1996	6,720	23,400
1997	2,940[1]	5,640
1998	2,730	4,630
1999	6,210	7,990
2000	5,180	6,840

Source: USGS Peak Streamflow for USA, 2001.
[1] Annual Maximum Peak
[2] USGS Estimated Discharge

Nearly two-thirds of the septic systems in the region do not meet state codes for discharge. The lateral fields of many such systems discharge directly into sinkholes through which surface water enters shallow aquifers. A recent four-year Illinois State Geological Survey study sampled wells and springs throughout the Sinkhole Plain, and found that in the summer months 55% of 29 private wells drilled into bedrock contained higher-than-recommended levels of coliform bacteria, a common indicator of fecal wastes. Since 1991 the Illinois Natural History Survey and the Illinois State Geological Survey have studied 10 karst springs in Monroe and St. Clair counties. Scientists found nitrogen in all 40 water samples collected from the springs, and at least one of four commonly used farm herbicides was detected in 33 of the 40 samples. However, none of the contaminants in these samples exceeded the U.S. EPA's minimum safe levels (IDNR, 1999).

The numerous caves in this area also exacerbate the problems with water quality as the surface water that flows into them may contain dissolved carbon dioxide, which can form mild carbonic acid. This acid, over time, dissolves the soluble bedrock and forms passages, chambers, pits, and eventually solution caves.

Overall, the water quality of rivers and streams in the Sinkhole Plain remains only fair (IDNR, 1999). Contaminants from point sources such as factories and city sewer systems have been reduced. However, contaminants such as excess nutrients from fertilized farm fields and partially treated sewage waste continue to contaminate rivers and streams by increasing bacterial growth, which depletes dissolved oxygen.

2.1.5 Floodplains

Only the extreme western tip of the project corridor does falls within the 100-year floodplain of the Mississippi River, commonly known as the American Bottoms. The project corridor will cross various tributaries of Silver Creek (i.e., Ash Creek, Engle Creek, Loop Creek, Mill Creek, Ogles Creek, Hagerman Creek, Rock Spring Branch, and Sugar Creek), Richland Creek, and Douglas Creek, as well as their associated floodplains (Table 2.4). Existing bridges and culverts over or within these floodplains will have to be expanded for those portions of the final routing that utilize existing roads. For those portions of the final routing that require new construction, bridges and culverts will have to be constructed were the road crosses these tributaries.

2.2 Biological Characteristics

The project corridor runs through predominantly agricultural and residential areas. Most of the aquatic and terrestrial habits in the project area have been fragmented and adversely impacted by human activities. Therefore, habitat and species diversity tend to be limited to those species that are most tolerant to human activities and other disturbances. The Sinkhole Plain area to the west of Millstadt does contain some unique biological resources. These unique biological resources include several floral and faunal species found only in caves and underground streams that are common to this area. Because of their limited distribution and unique habitat requirements, many of these cave and underground stream species are listed on Federal and/or state of Illinois endangered and threatened species lists.

2.2.1 Aquatic Environment

The major aquatic habitats in the project corridor are the Silver Creek watershed in the north-south portion of the project corridor and Richland Creek watershed in the east-west portion. These two watersheds contain extensive forested and emergent wetland areas, particularly Silver Creek. The remaining aquatic habitats are abandoned strip mines that form ponds of varying size. The aquatic habitat in the project corridor is part of the Lower Kaskaskia Watershed, which is identified by the USEPA as having serious water quality problems.

The proposed corridor is located to the west of the mainstem of Silver Creek and crosses a number of tributaries to Silver Creek, as noted in Table 4. As the project corridor turns westward and heads toward the Mississippi River, it crosses Richland Creek, its tributary Douglas Creek, Palmer Creek and Hill Lake Creek.

Based on a field reconnaissance of the project corridor, the Silver Creek tributaries varied from between 5-20 feet in width, with water depths of less than 12 inches. Richland Creek was roughly 30-40 feet wide and 12-18 inches in depth. The banks of many of the Silver Creek tributaries were quite steep and in some cases undercut. Many of the streams had clear water, sandy or gravelly bottoms, and riffle areas. Richland Creek had clear water with a rocky bottom, riffles, and steep banks in the area where the project corridor crosses the stream. Very little in-stream vegetation

Table 4
Creeks Crossed (From North to South) by the IL-158 Project Corridor

MADISON COUNTY	ST. CLAIR COUNTY	MONROE COUNTY
1. Mill Creek	2. Ogles Creek	10. Palmer Creek
	3. Hagemann Creek	11. Hill Lake Creek
	4. Engles Creek	
	5. Rock Spring Branch	
	6. Ash Creek	
	7. Loop Creek	
	8. Sugar Creek	
	9. Douglas Creek	

was present; existing vegetation was generally limited to upland elevations. A review of the USGS flow data for Silver Creek and Richland Creek, and field observations of scour and drift lines, indicates that these tributaries are frequently subjected to both very high and very low flow conditions. During the summer months, flow rates in many of these tributaries may be reduced to a trickle, while in the spring months the flows overtop the banks.

Based on information from USEPA databases, all these tributaries have been degraded by municipal discharges, agricultural activities, past surface mining activities, and/or channel modifications. Consequently, there is very little data on the floral and faunal species present in these streams. It is unlikely that the tributaries to Silver and Richland Creek contain any significant floral and faunal populations, due to very low flow rates during much of the year. Silver and Richland Creeks probably support more diverse flora and fauna, but because of the activities mentioned above, it is likely that the species present are tolerant to pollution and disturbance. Several *Corbicula sp.* shells were noted during the field reconnaissance of Richland Creek.

Most of the region's lakes support game fish populations; however, none of the lakes is considered to be in excellent ecological condition (IDNR, 1999).

2.2.2 Terrestrial Environment

Most of the project corridor contains agricultural fields and residential areas. Consequently, most of the former woodlands, prairie areas, and associated wildlife, that were formerly abundant in the region have been eliminated. The remaining terrestrial habitat is limited to small, isolated wooded areas, tree rows bordering fields, and narrow strips of vegetation along waterways. Stemler Woods and the common moorhen habitat (illustrated in Figure 4) are the primary high-quality terrestrial habitats in the project corridor.

<u>Flora</u>

The project corridor is dominated by floral species that are typical of suburban and agricultural areas (e.g. cash crops, lawn grasses, ornamental shrubs and trees, and introduced and native invasive trees, shrubs, grasses, and forbs). Portions of the final route will be along existing roadways that run through residential and agricultural areas. Therefore, the primarily flora in these area will be lawn grasses and cash crops.

The project corridor crosses a number of tributaries to Silver Creek with areas of upland woodland, shrubs, grasses and forbs that, for the most part, are typical of disturbed areas (e.g. boxelder, eastern cottonwood, silver maple, sycamore, black locust, fescue, Japanese honeysuckle, and Queen Anne's lace). Higher quality flora was noted in the few isolated woodland areas (between the I-55/70 interchange and Troy-O'Fallon Road). Typical species in these areas included black cherry, black oak, hackberry, red oak, shagbark hickory, shingle oak, slippery elm, sycamore, white oak, evening primrose, common buckthorn, fescue, Japanese honeysuckle, and multiflora rose.

The portion of the project corridor from Carlyle Road to just west of Interstate 255 extends through a major wooded area that includes Stemler Woods, which is a protected area. Most of this part of the project corridor is locally known as the Sinkhole Plain. The Sinkhole Plain has much higher species diversity and contains species typical of more established, less disturbed areas. Of the 1,075 plant species found in this area, four out of five are native, as compared to the rest of the state where 71% of the plant species present are native (IDNR, 1999). Floral species typical of these areas are shown in Table 5.

Fauna

Faunal diversity along the project corridor is predominantly limited to those species that are tolerant to human activity. These species include the American kestrel, crow, opossum, raccoon, groundhog, chipmunk, rabbit, skunk, cardinal, common sparrow, starling, common grackle, black-capped chickadee, tufted-titmouse, bluejay, garter snake, American robin, dove, field mouse, Canada goose, mallard, white-tailed deer, gray squirrel, American toad, red-tailed hawk, and ring-tailed pheasant.

The list of local birds formerly included species, such as the swallow-tailed kite, that have become extirpated since 1820. Other bird species are still present but no longer breed here; among them are the trumpeter swan, osprey, least tern, and yellow-headed blackbird.

The protected woodlands, such as Stemler Woods, have a much richer faunal diversity, comprised of many species that are less tolerant of human activities. Summer birds observed in these wooded areas include dove, yellow-billed cuckoo, red-haired woodpecker, yellow-bellied sapsucker, acadia flycatcher, crow, black-capped chickadee, tufted titmouse, blue-gray gnatcatcher, redwing, grackle, cowbird, scarlet tanager, cardinal, indigo bunting, and cerulean warbler (Illinois Nature Preserves Commission, 1976).

Table 5
Typical Floral Species in Protected Woodland Areas in St. Clair County, Illinois (continued)

SCIENTIFIC NAME	COMMON NAME
Shrubs	
Cephalanthus occidentalis	Buttonbush
Cornus drummondii	Rough-leaved dogwood
C. stolonifera	Red osier dogwood
Ilex deciduas	Swamp holly
Rhus aromatica	Aromatic sumac
R. copallina	Dwarf sumac
R. glabra	Smooth sumac
R. radicans	Poison ivy
Ribes missouriense	Missouri gooseberry
Rosa Carolina	Pasture rose
R. multiflora	Japanese rose
R. setigera	Illinois rose
Rubus allegheniensis	Common blackberry
Sambucus Canadensis	Common elder
Staphylea trifolia	Bladdernut
Symphoricarpos orbiculatus	Coralberry
Vines	
Campsis radicans	Trumpet creeper
Lonicera japonica	Japanese honeysuckle
Menispermum canadense	Moonseed
Parthenocissus quinquefolia	Virginia creeper
Smilax hispida	Bristly green brier
Vitis aestivalis	Summer grape
V. cinerea	Winter grape
V. vulpine	Frost grape

2.2.3 Cave Environment

There are a number of caves located in the west end of the project corridor, near Millstadt and Columbia, Ill. The conditions in these caves remain fairly constant throughout the year: however, conditions vary considerably from one cave to another. As a result of this variation between caves and the constant environmental conditions within each cave, every cave supports its own unique ecosystem. Because of these constant environmental conditions, many of the species in these caves are intolerant to disturbances of any kind. As a result of this intolerance and the encroachment of human activities on these unique ecosystems, many of these species have been placed on endangered and threatened species lists. Some of these species are discussed in section 2.2.5.

Although many of these caves have been examined for decades, the focus of these studies has been primarily on the faunal species. As a result, many of the unique flora within these systems have yet to be identified.

2.2.4 Wetlands

Much of the wetland areas that existed in the project area have been cleared and converted to agricultural land within the last 200 years. In Monroe County, 24% of the land (or 56,000 acres) consisted of wetlands in 1820. Today, approximately 17,000 acres of wetlands remain. In St. Clair County, 33,000 acres of the original 78,000 acres of wetlands remain in existence. A total of more than 87,000 acres of wetlands have been drained, primarily floodplain forest in the American Bottoms that was cleared for farms (IDNR, 1999). Remaining wetlands, based on the National Wetland Inventory, are shown in Figure 5.

Nearly 7% of the land within the Sinkhole Plain is currently classified as wetlands and the region has a higher proportion of trees, wetlands, and twice as much urban and built-up land as the rest of the state. Of the original, presettlement-quality wet floodplain forest, 44% still remains within the region, as is 43% of the high-quality limestone glades. The Marissa Woods Nature Preserve in St. Clair County contains roughly 33% of the original southern flatwoods (IDNR, 1999).

Extensive forested wetland areas exist along Silver Creek to the east of the project corridor. Some of these wetlands along this creek, such as Silver Creek Marsh, are of reasonably high quality. Silver Creek Marsh is a 54-acre site located southeast of Scott Air Force Base. Natural communities include shrub swamp/pond, low-gradient creek, and wet floodplain forest. Exceptional features include a pond, a swamp and a perennial stream. Wetland species found onsite include boxelder, silver maple, eastern cottonwood, honey locust, white mulberry, swamp white oak, pin oak, black willow, American elm, buttonbush, swamp holly, buttonwood, trumpet creeper, bristly green brier, winter grape, sedges (*Carex spp.*), hairy rose mallow (*Hibiscus lasiocarpus*), fringed loosestrife (*Lysimachia ciliata*), fog fruit (*Phyla lanceolata),* mild water pepper (*Polygonum hydropiperoides*), lizard's tail (*Saururus cernuus*), golden ragwort (*Senecio aureus*), and swamp dock (*Rumex verticillatus*) (Illinois Nature Preserves Commission, 1976).

A number of other wetland areas are located within the project corridor: however, these areas are much smaller and are not contiguous. A few wetland areas were noted where the project corridor crossed Hagemann Creek (on the west side), Engles Creek (on the west side), Richland Creek (on the west side), and Douglas Creek (on the north side just east of the existing IL-158). The noted wetland areas were small (i.e. less than 0.5 acres) and limited to low areas near the creek or the banks of the creek. These wetlands were generally degraded and comprised of species that are tolerant to disturbed conditions. Dominant species in these wetlands included boxelder, silver maple (*Acer saccharinum*), eastern cottonwood, honey locust, green ash (*Fraxinus pennsylvanica subintegerrima*), slippery elm, common horsetail (*Equisetum arvense*), and reed canary grass (*Phalaris arundinacea*).

2.2.5 Threatened and Endangered Species

About 75 plant and animal species whose survival is threatened or endangered, including five species whose survival is at issue not only in Illinois but also in the U.S. as a whole, are known to occur in Madison, Monroe and St. Clair counties. These listed species include 24 plant species, 36 animal species, and 12 species that are found in streams and wetlands (three freshwater mussels, two crustaceans, two fish, one amphibian and four reptiles). One of the fish species, the western sand darter is fairly common in clear sandy runs of the upper Mississippi, but outside of that setting it survives in only a few places, including the Mississippi River just south of Prairie Du Rocher. One of Illinois' rare aquatic worms (a sludge worm) dwells only in springs such as those found at two sites in Monroe County and one site in St. Clair County. The Illinois chorus frog is known to occur near Edwardsville and in the American Bottoms in Monroe County (IDNR, 1999).

Most of the listed species are likely to be located in large tracts of established woodlands, particularly along Silver Creek, just east of the project corridor and in the sinkholes and caves in the extreme western portion of the project corridor. The project corridor is located to the west of Silver Creek but does pass through the sinkhole and cave areas. Listed species that may be in the project corridor are the Indiana bat (*Myotis sodalis*), Illinois cave amphipod (*Gammarus acherondytes*), cave-dwelling snail (*Fontigens antroecetes*), common moorhen (*Gallinula chloropus)* and Illinois false aster (*Boltonia decurrens*). Figure 5 shows known locations of the Illinois cave amphipod and the common moorhen.

<u>Indiana bat</u>
The Indiana bat is on the federal endangered species list. In summer, it roosts beneath the peeling bark of dead trees while in the winter it hibernates in underground caves and abandoned mines. A biological survey done by the IDNR in the project area did not list the Indiana bat as a significant biological finding (IDOT memorandum Dec. 29,1997). Areas of particular concern consist of riparian areas along Douglas, Silver and Richland creeks, sinkhole and cave areas and Stemler Woods. Fogelpole Cave has historically sheltered more hibernating Indiana bats than any other place in Illinois.

<u>Illinois cave amphipod</u>
This species is a troglobyte, or cave-dwelling creature, and is on the federal list of endangered species. The Illinois cave amphipod is a small crustacean that is light gray-blue in color and is less than an inch in length. The cave amphipod lives in the 'dark zone' of cave streams and it requires cold water to survive. This species is

intolerant to variations in temperature or light as well as the presence of water pollution. Its sensitivity to contaminants makes the cave amphipod an excellent indicator of cave streams and the groundwater that feeds them. Its diet consists of dead animals and plants as well as the thin bacterial film covering submerged surfaces.

Due to the strict environmental criteria necessary for its survival, this species has never been widely distributed. It is endemic to the Illinois Sinkhole Plain in Monroe and St. Clair Counties in southwestern Illinois. Historically, the Illinois cave amphipod was confined to six cave systems, all within a 10-mile radius of Waterloo, Illinois. These caves are fed by separate watersheds, with no known connection among them. Therefore, scientists believe it is unlikely that the amphipod could be distributed to other cave systems via streams. Currently, it is found in only three of the original six cave sites, all of which are located in Monroe County. Entrances to two caves are owned by the IDNR, which allows public use of one of the sites. Three entrances to the third, privately owned cave are dedicated as Nature Preserves and are therefore protected.

Illinois Caverns, Krueger-Dry Run Cave, and Fogelpole Cave (in Monroe county) currently support the Illinois cave amphipod. Stemler Cave formerly supported this species, but it has not been reported there since 1965 (Webb 1993, Webb *et al.* 1996 as cited in Taylor and Webb, 2000). No specimens of the cave amphipod were collected in Madonnaville Cave in a study conducted in 1995. Pautler Cave, the sixth known home of the species, was bulldozed shut by the landowner (IDNR, 1999).

This species has been observed in the Salem Plateau apparently feeding in shallow, sediment bottomed areas lateral to stream riffles. These feeding habits, combined with their utilization of benthic microhabitats, create strong ties between amphipods, sediments, and the potential chemical contaminants contained in the sediments (Taylor and Webb, 2000). According to Philip Moss (memo, Dec. 5, 2000), there is considerable evidence that not all the populations of the Illinois Cave Amphipod have been found. During a recent general cave biology study for the Nature Conservancy, two new populations of the Illinois cave amphipod were found. These populations were found in what appear to be entirely separate groundwater systems from previously known populations. The karst area north of Columbia has not been thoroughly examined for the presence of this species or other rare species.

Cave-dwelling Snail

Fontigens antroecetes is a snail that is found in Stemler Cave and nowhere else in the world (Philip Moss, personal communication, 12-5-00).

Common Moorhen

The common moorhen, *Gallinula chloropus,* is an Illinois threatened species that was first listed in 1977. It is a chicken-like bird approximately 12-15 inches in length. The number of individuals remaining is small and the critical habitat for this species is likewise threatened. The critical habitat for the common moorhen includes terrestrial, aquatic and riparian areas. Terrestrial habitat associations include agricultural, pastoral, non-forested wetlands and lakes, streams and reservoirs in forestlands. Aquatic habitat includes shallow areas with emergent vegetation. Clean, unpolluted waters are necessary for the survival of the common moorhen (Illinois Department of Natural Resources, 2001).

The Common Moorhen was located within an area that the project corridor passes through, in a survey conducted in 1993. Its range at the time of the survey was located in a wetland area south of Schlueter Road and north of the eastern part of Schiermeier Road. The common moorhen sporadically occupies wetland areas such as freshwater marshes, canals, quiet rivers, and lakes and ponds with emergent aquatic vegetation throughout Illinois (IDOT memorandum December 29,1997).

<u>Illinois false aster</u>

Boltonia decurrens (Illinois false aster) is a federally listed threatened species. It is currently threatened in Illinois and endangered in Missouri. This species is found in moist, sandy floodplains with alluvial deposits and in prairie wetlands along the Illinois River. Although intolerant to prolonged flooding, this species relies upon periodic flooding to out-compete other herbaceous and woody species. The Illinois false aster can tolerate drought: however abundant light, moist soil and moderately high temperatures are required in order for its seeds to germinate. Reproduction occurs both sexually and asexually and seeds are dispersed by both wind and water. Threats to this species include siltation, which smothers seeds and seedlings, and the loss of critical wetland habitat (USFWS, 1990).

This listed species has been surveyed and the sites have varied with each survey, primarily because the species has disappeared at certain sites and established at new sites. In 1988, it was found along the Mississippi River in St. Clair County.

2.3 Ecologically Significant/Protected Areas

There are five Illinois Natural Areas Inventory sites located in or adjacent to the project corridor, all of which are in St. Clair County (Illinois Nature Preserves Commission, 1976). These areas are Freeburg Woods, Dupo Prairie, Sugar Loaf Prairie, Stemler Cave and Woods, and Julius J. Knobeloch Woods (Figure 4). Only Stemler Cave and Woods is actually located within the project corridor.

Freeburg Woods is a privately owned preserve located to the northeast of Freeburg, Ill., just outside the project corridor. It contains a total of 216 acres comprised of wet floodplain forest, wet-mesic floodplain forest, and low-gradient creek areas. Typical tree, shrub, and vine species are listed in Table 5. Ferns found onsite include sensitive fern and the rattlesnake fern. A perennial stream is the only exceptional feature.

Dupo Prairie is a privately owned, 13-acre site located near the Mississippi River, northwest of the Stemler Cave area just outside the project corridor. Natural community types include loess hill prairie, dry-mesic upland forest, dry upland forest, and limestone cliff. Exceptional features include a spring, a cave, limestone cliffs, and a Grade A limestone cliff community.

Sugar Loaf Hill Prairie is a 19-acre, privately owned site located to the south of Dupo Prairie. Natural communities include loess hill prairie, limestone glade, dry upland forest, dry-mesic upland forest, and limestone cliff community. Exceptional features include an Indian mound, Grade A limestone cliff community, and limestone cliffs.

The Stemler Cave and Woods is a 3,260-acre, privately owned site located to the west of Millstadt. Stemler Woods accounts for 173 acres of this area. The project corridor bisects this area, on the south side of Stemler Woods. Natural communities include southern flatwoods, mesic upland forest, dry-mesic upland forest, dry upland forest, pastureland, cropland, sinkhole ponds, developed land, limestone cliff community, successional field, terrestrial cave community, and aquatic cave community. Typical plant species are included in Table 5. Exceptional features include the cave, spring, intermittent stream, the woods, and a Grade A limestone cliff community.

The Julius E. Knobeloch Woods Nature Preserve is approximately 80 acres in size and is located to the north of Freeburg. Although little information was available on this nature preserve, it is assumed that many of the species noted in Table 5 would be present in this woodland.

2.4 Land Use

The project corridor is predominantly rural and can be divided into two distinct areas with respect to land use. The portion of the project area that extends from Troy to Carlyle Road consists primarily of agricultural fields and residential areas. From Carlyle Road westward to just west of Interstate 255, the project corridor is much more diverse and is comprised of agricultural lands, abandoned strip mines, natural areas, and sinkholes.

Agricultural fields and pastureland are the primarily uses for much of the land in the project corridor. A greater percentage of the land is devoted to agricultural use in the Troy to Carlyle Road portion than in the Sinkhole Plain portion. Agriculture accounts for roughly 60 percent of the land use in this latter area, as compared with approximately 78 percent for the state of Illinois as a whole.

Coal mining has been an integral part of the region's economy since the early 1900s. Figure 2 illustrates the location of mines and permitted mining areas within the project corridor. Soil erosion in the bluffs east of St. Louis exposed coal seams that were originally mined in 1837. Coal mining reached its peak in the 1920s: however, due to the high sulfur content of coal in Illinois, coal mining has decreased sharply in the area. As a result, there is currently no mining activity within the region. Many mines were abandoned and the resulting mine spoils are still present. Old pits serve a similar function as wetlands in that water is stored, then released into streams during dry periods (IDNR, 1999). Strict environmental regulation prohibiting the abandonment of mining sites began in the 1970s and, as a result, mining companies have subsequently been required to reclaim and restore mining sites.

The Sinkhole Plain area contains a higher proportion of natural areas than the rest of the state despite intense population pressure within the region. Twice as much pre-settlement habitat remains within this area when compared to the rest of the state. The total acreage is only approximately 1,215 acres, less than two-tenths of one percent of what once was here (IDNR, 1999). This higher percentage of natural areas is due, in part, to the area's topography, which includes caves and bluffs that are not suitable for agriculture or development. When the state was surveyed in the 1970's for the Illinois Natural Areas Inventory (INAI), it was determined that 32 top-quality remnants of 17 pre-settlement natural community types remained in existence. The list included seven kinds of forest, glades, seeps and springs, and three kinds of prairies. In addition to community types, the INAI surveyors also found 12 unique geologic areas, which included limestone cliffs, exposed sandstone bedrock, sinkhole ponds, and caves. Nearly half of the original loess hill prairie remains (IDNR, 1999).

2.5 Solid/Special Waste

Hazardous and/or toxic waste sites, from USEPA databases, located within the project corridor are shown in Figure 6. Of the 29 sites identified, 26 are underground storage tanks (USTs) and 3 solid waste landfill (SWLF) areas. These sites are concentrated near Mid America Airport/Scott Air Force Base (3), Belleville (2), and Columbia (23). One leaking underground storage tank (LUST) has been identified near the Mid America Airport.

Without such measures, there is a serious risk that pollutants could quickly enter the groundwater and underground streams through the numerous sinkholes throughout this karst area. Many of the unique habitats and species in this area are already experiencing decreased water quality from human activities in the area. In addition to concerns about adverse impacts to water quality, some wetland areas and protected habitat may be eliminated.

2.6 Agricultural

The project corridor traverses agricultural land. Much of the project corridor in St. Clair County south of the existing section of IL-158 (south of IL-161) is predominantly prime farmland (68% to 95% prime farmland). The project corridor in Madison County, south of Troy, and in Monroe County, east of Columbia also contains prime farmland.

2.7 Human Development

Cemeteries, worship centers, government centers, hospitals, and schools in and around the project corridor were identified, and are shown in Figure 7.

Cemeteries

Many cemeteries are located within the project corridor, especially north of I-64 to the interchange of I-55/70 and US 40 in Troy. Another small concentration of cemeteries is located on the western end of the project corridor, south of Columbia.

Worship Centers

A worship center is located immediately south of the I-55/70 and US 40 interchange in Troy.

Government Centers

No major government facilities are located within the project corridor

Hospitals

No major hospitals or medical facilities are located in the project corridor. However, should a new transportation facility be built within the project corridor, that facility would improve the overall access system to the existing two civilian and one military hospital.

Schools

No major school facilities are located in the project corridor, but any new transportation facility built would improve access to the schools in all three counties.

Residential/Non-Residential Displacements

Due to the size of the project corridor and the lack of a specific alignment, no specific residential or non-residential displacements were identified.

Archaeological Areas

As can be expected in the floodplains, bluffs, and uplands near a major river, there are potential archaeological areas of possible significance. Prehistoric cultural materials have been found within the project corridor, especially on the far west end of the project corridor. An archaeological area is also located east of the project corridor along Silver Creek.

Historic Sites

Due to the size of the project corridor and the lack of a specific alignment, no specific historical sites or historic eligible sites were identified.

3. ENVIRONMENTAL CONCERNS AND POTENTIAL CONSEQUENCES

The project corridor contains some unique geological and ecological resources in the Sinkhole Plain as well as moderate to high quality upland and wetland resources along Silver Creek. Because of these unique resources, there are a number of protected habitats and nature preserves in these two areas. While the project corridor avoids some of these critical resource areas, it still passes through the Mississippi River Basin karst and Stemler Cave and Woods areas, just west of Millstadt.

These latter areas are particularly vulnerable to the environmental perturbations associated with construction and operation and maintenance of the proposed IL-158 extension. Sound erosion control measures and closed drainage systems will be essential to avoid adverse impacts to the valuable natural resources within this area.

3.1 Physical Resources

It is unlikely that there will be any significant impacts to soils, geological features or groundwater flows from the proposed extension if proper siting criteria and engineering practices are employed. Excavation and fill activities will be necessary to maintain a proper road grade. Sinkholes and areas of soil instability would be avoided for cost and safety reasons. Such areas would have the greatest potential for subsidence and adverse impacts to these physical resources. It is more likely that the proposed project could affect surface water flows and the quality of ground and surface waters.

3.1.1 Surface water

As indicated in Table 4, the project corridor crosses at least 11 different creeks. Some of the final route for the proposed IL-158 extension may utilize existing highways, such as Troy-O'Fallon Road, IL-158 and Douglas Road. Other portions of the proposed IL-158 extension will require the construction of new roads. For the existing roadways, bridges and/or culverts currently in place will have to be widened and/or resized. Bridges and/or culverts will have to be constructed for the new portions of the proposed route.

This work will require a Section 201 Water Quality Certification from the state of Illinois. It is assumed that these bridges and culverts will be properly designed, sized and constructed so as not to impede the flows or otherwise obstruct these creeks. It is anticipated the flow rates will increase in some of the creeks not located in the Sinkhole Plain due to drainage ditches constructed parallel to the road for conveying highway runoff. This is not expected to be the case for the creeks located in the Sinkhole Plain, which are likely to have closed drainage systems to prevent runoff from entering underground streams and aquifers which are connected to the surface via sinkholes or caves.

The most likely impacts to surface water flows will be from drift materials carried by high flows during flooding periods after the roads are constructed. Unless the drift material is removed in a timely fashion, it can build up and prevent water from moving through the bridge or culvert areas. The built up drift material acts like a dam, ponding water on the upstream side and reducing flow rates on the downstream side. This condition could lead to prolonged local overbank flooding, causing damage to nearby structures, croplands or natural resources. Such impacts would be short-term and easily alleviated by the timely removal of drift material.

These concerns are manageable and well known and no long-term adverse consequences to surface waters are anticipated from the construction and operation of the proposed IL-158 extension.

3.1.2 Water quality

Impacts to surface and groundwater are a primary concern associated with construction and operation of the proposed IL-158 extension, particularly in the Sinkhole Plain area to the west of Millstadt. In this area, sedimentation from construction activities and pollutants (e.g. salt, sulfur compounds, hydrocarbons, etc.) from operation and maintenance of the proposed highway may quickly enter the local surface waters and groundwater via runoff. Because of the sinkholes and sinking and underground streams in the area, these pollutants may directly and/or indirectly enter the local drinking water supply or areas of unique underground habitats with sensitive and intolerant species.

The land within the project corridor experiences intense use and, as a result, land and water pollution and sedimentation of surface and ground waters are already a problem. Additional pollutants from the construction and operation and maintenance of the proposed highway could exacerbate this problem unless best management practices are employed. The potential for adverse effects from operation and maintenance of this proposed highway are supported by a number of studies. In a 1977 study by the EPA, it was found that 0.125 g of pollutants are contributed per vehicle per kilometer (or 0.0004 pounds /vehicle/mile) from tire wear alone (as cited in PELA, 1995). A long-term investigation of the impact of highways on water quality revealed that in the case of highways with average daily traffic (ADT) of fewer than 30,000 vehicles per day, the impact is minimal.

Surrounding land use, however, greatly influences the extent to which contaminants from highway runoff impact water quality (PELA, 1995). Another study of interstate runoff in Rhode Island, by Hofman *et al.* (1985) concluded that greater than 50 percent of the annual pollutant loads of solids, polyaromatic hydrocarbons (PAHs), lead, and zinc to an adjacent river were the result of highway runoff. In an investigation of highway bridge runoff, Yousef *et al.* (1982 and 1984) found that heavy metals, once introduced, tend to persist in bottom sediments, floodplains, and adjacent soils (PELA, 1995). Sedimentation or filtration may effectively remove all of these toxic metals, with the exception of zinc. Studies of recharge basins with large loads of metals have shown that most heavy metals are removed in the basin sediment or in the vadose zone (PELA, 1995). The extent to which highway runoff negatively impacts groundwater depends upon many factors, including local hydrogeologic conditions, sorption capability of the aquifer material, and the velocity of the groundwater (PELA, 1995).

The potential for impacts to surface and groundwater quality in the Sinkhole Plain area warrants the use of closed drainage systems to collect and divert runoff to controlled storage areas for treatment prior to release to local surface waters. Additionally, aggressive erosion control measures will be required in this area to isolate the construction areas from the sinkhole, cave and sinking stream areas in order to avoid sedimentation via runoff to these unique areas.

Some potential for surface water quality impacts do exist in the remainder of the project area, primarily between Troy and Millstadt. However, most of the surface waters in this area have only fair water quality. In order to prevent further degradation of local surface water quality, best management practices should be employed to minimize sedimentation to local surface waters during construction. Additionally, runoff from the constructed highways and bridges should be diverted through vegetated drainage ditches prior to release to local waterways.

3.2 Biological Resources

The construction of the proposed highway and subsequent operation and maintenance have the potential for adversely impacting surface water quality, eliminating or further degrading the limited wetland resources available in the project area, and eliminating valuable woodland habitat in the Stemler Woods. Impacts to surface water quality may, in turn, cause adverse impacts to aquatic biota primarily in the Sinkhole Plain area west of Millstadt.

3.2.1 Aquatic

Most of the aquatic habitat in the project area has been adversely impacted by agricultural, mining and residential activities. Consequently, the quality of these streams is listed as fair and the aquatic resources therein generally consist of species that are tolerant to disturbed conditions. However, the Sinkhole Plain area has some very unique underground aquatic habitats that are of higher quality. Because of their higher quality and isolation from many of the development activities in the area, these habitats contain a number of intolerant fauna and floral species. Many of these species are protected because of their limited distribution, small population sizes and intolerance to pollutants and other disturbances.

The primary concerns in this area are sedimentation and the introduction of pollutants into the unique aquatic habitats within the Sinkhole Plain. Such pollutants not only degrade the water quality, they also adversely impact the unique species that live in these environments. Avoidance of sinkhole and sinking stream areas and the use of closed drainage systems should alleviate these concerns. In addition, the use of native vegetation in the drainage ways along the proposed highway to collect runoff, should minimize any further degradation of streams in the project area.

3.2.2 Terrestrial

Most of the project corridor for the proposed IL-158 outer belt highway passes through agricultural and residential areas that contain species that are tolerant to human activity. Therefore, concerns with respect to impacts to the limited terrestrial resources in this area are minimal. The primary area of concern is for the flora and fauna located in Stemler Woods. Based on information from the Illinois Nature Preserves Commission, this wooded area supports rich species diversity. The project corridor appears to go south of this wooded area and impacts to the fauna and flora should be minimal. If clearing of the southern part of Stemler Woods is required for the proposed highway, there is an increased likelihood of potentially adverse impacts to terrestrial resources of moderate to high quality. Such resources are very limited in this region and additional studies and approval would likely be required from the Illinois Department of Natural Resources (IDNR).

3.2.3 Wetlands

There is the possibility that some degraded wetlands will be lost as the result of construction activities associated with the realignment of IL-158. Wetland determination studies will be required in the areas identified in Section 2.2.4 prior to construction to determine if these are jurisdictional wetlands. In addition, the exact areas and the floristic quality of each area that will be impacted by the proposed highway will need to be assessed. A section 404 permit from the U.S. Army Corps of Engineers may be required and a mitigation plan developed to offset the loss of any jurisdictional wetlands.

3.2.4 Threatened and Endangered species

Any threatened and/or endangered species are likely to be found in the Sinkhole Plain area, as Stemler Woods and most of the unique underground aquatic habitats occur here. The Indiana Bat may use caves in the area and dead trees within Stemler Woods. As previously noted, many of the species (e.g. Illinois cave amphipod, cave-dwelling snail, etc.) found in the caves in the Sinkhole Plain are on federal and state protected species lists.

Threats to the survival of the Illinois cave amphipod include groundwater pollution from pesticides as well as groundwater contamination from human and animal wastes. In addition, pesticides and fertilizers applied to nearby farms can end up in the groundwater and can subsequently affect the cave streams that are fed by this groundwater. Likewise, contamination from septic systems, sewers, or livestock feedlots, or accidental or intentional dumping of toxic substances into sinkholes can result in contaminated groundwater. Scientists have found evidence of several pesticides in nearby streams, wells and springs that may end up in the cave streams and affect the cave amphipod. Metals and bacterial pollution were also present in nearby wells, streams and springs. The presence of these contaminants indicates that the deterioration of water quality could be a likely cause of the population decline of the Illinois cave amphipod. Human use of caves inhabited by the amphipod could also be a factor affecting its survival (USFWS, 2000).

Impacts to the Indiana bat can be minimized through the avoidance of cave areas and by limiting the timing of construction to avoid the summer roosting periods (if portions of Stemler Woods are cleared for the proposed highway). Impacts to listed species found in caves, sinking streams and underground streams could be greatly minimized if these areas are avoided and closed drainage systems are utilized to collect runoff during construction and operation of the proposed highway.

3.3 Protected Habitats and Ecologically Sensitive Areas

The project corridor for the proposed IL-158 extension avoids most of the protected habitats and ecologically sensitive areas. The only area that may be impacted is Stemler Woods. The likely routing for this highway extension appears to be to the south of this area. If so, no impacts would be anticipated. However, if the route is constructed through the woods, part of this habitat could be eliminated and coordination with the IDNR and the Illinois Nature Preserves Commission would be required.

3.4 Land Use

The proposed highway is not expected to cause any significant changes in land use. In fact, the need for the extension is the result of changes in land use in the area due to an increase in residential development.

3.5 Solid/Special Waste

A number of potentially hazardous and toxic waste sites were identified within the project corridor. Phase I studies will be required prior to construction to determine the exact location and nature of the wastes at this site, as well as the need for Phase II studies.

3.6 Agricultural

Due to the extent of agricultural land in the proposed highway corridor, a new highway would impact farm operations on prime and important farmlands. A subsequent Phase I study would identify specific impacts. Coordination with the Illinois Department of Agriculture and local agricultural agencies would also occur, along with continued public involvement during the entire project process.

3.7 Human Development

Due to the extent of human development in the proposed highway corridor, a new highway would impact human development. A subsequent Phase I study would identify specific impacts. Coordination with the appropriate agencies would also occur, along with continued public involvement during the entire project process.

3.8 Summary of Concerns and Consequences

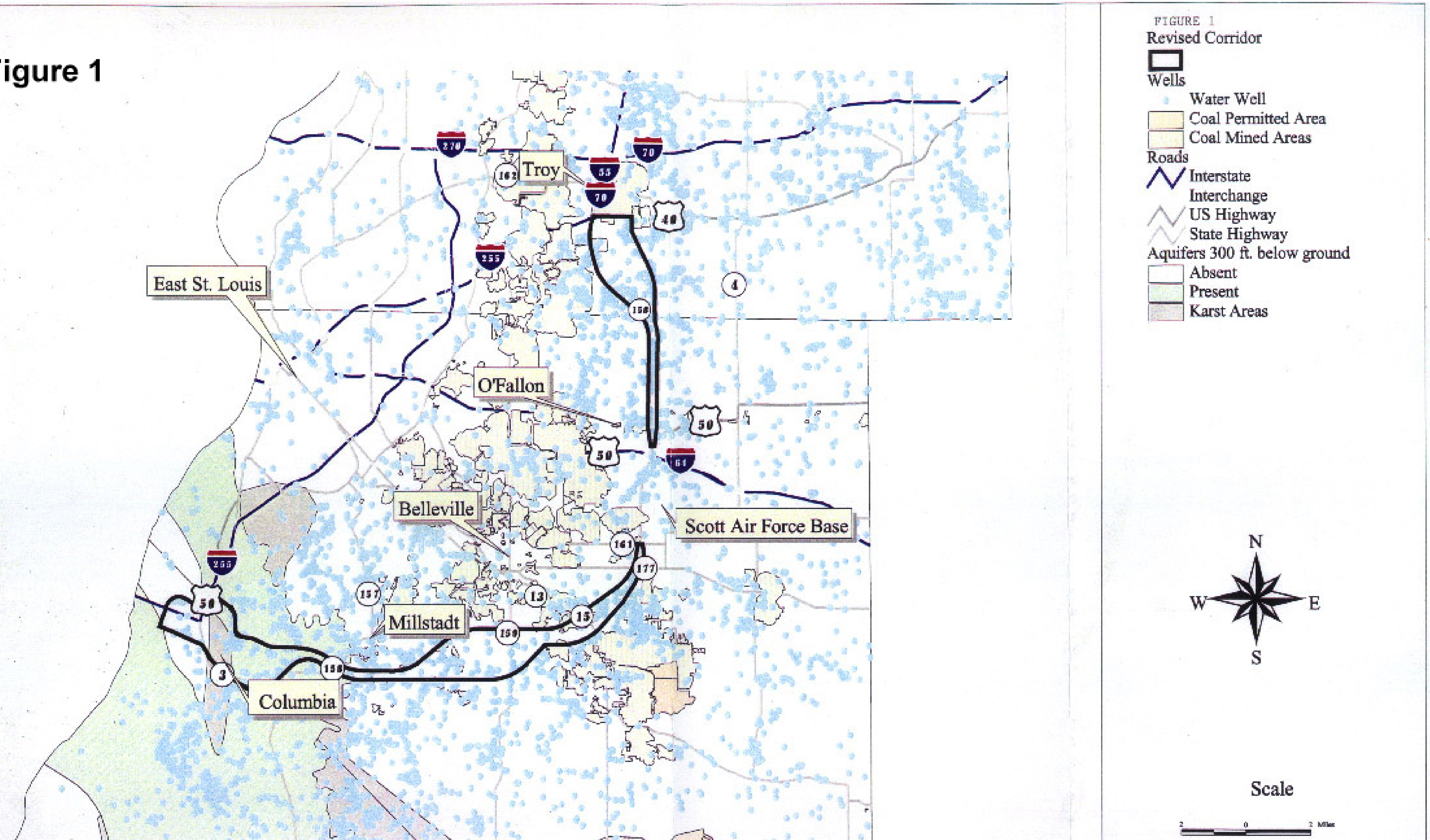
Based on the current project corridor for the proposed IL-158 outer belt highway, most of the concerns are for the Sinkhole Plain area. Although there are some small, degraded wetlands that may require mitigation in the remaining project area, the Sinkhole Plain area contains significant geological and biological resources that may be adversely impacted if the highway is located in close proximity to sinkholes, caves and sinking stream areas. Because of these unique geological features, the typical soil filtration system is absent and sediments and pollutants migrate quickly to underground streams, caves, and aquifers. These sediments and pollutants may adversely impact significant and protected aquatic flora and fauna in these habitats, as well as local drinking water supplies.

Because of the significance of the resources in the Sinkhole Plain, the final alignment for the IL-158 outer belt highway is expected to avoid these areas. Additionally, a closed drainage system would be used to convey sediments and pollutants away from these areas. Therefore, impacts are expected to be minimal.

4. AGENCY COORDINATION

Correspondence was initiated with the Illinois Department of Natural Resources (IDNR) and the United States Fish and Wildlife Service (USFWS) in the form of letters requesting a database search for the project area. IDNR responded with a letter indicating that the common moorhen and the Illinois cave amphipod have been found historically with the project study area. Other areas of concern include the Julius Knobeloch Woods, Stemler Cave Woods, and Pruit Sinkholes Nature Preserves. No response was received from the USFWS.

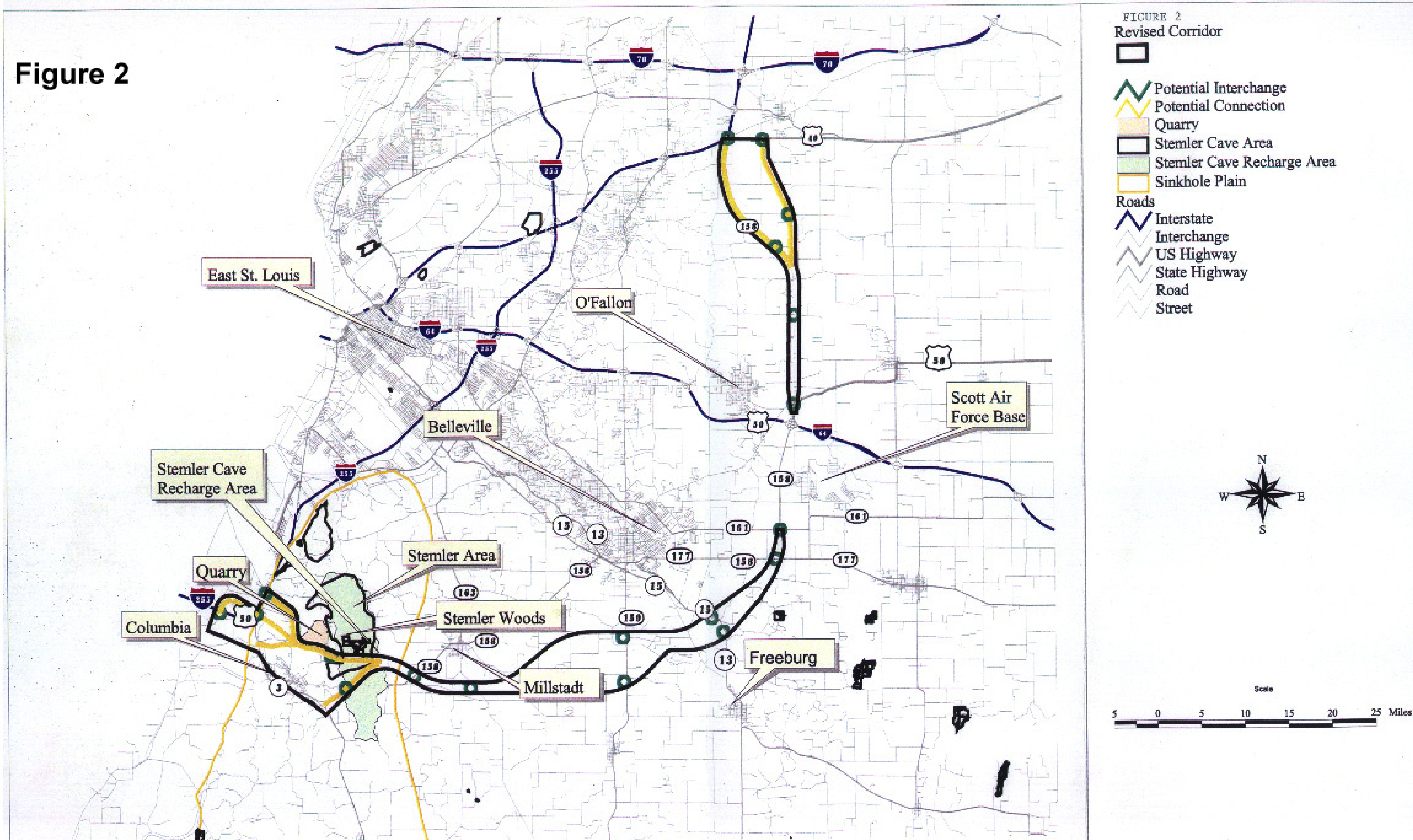
Figure 1



Subsurface Features in Route 158 Corridor

ZAMBRANA Engineering, Inc.

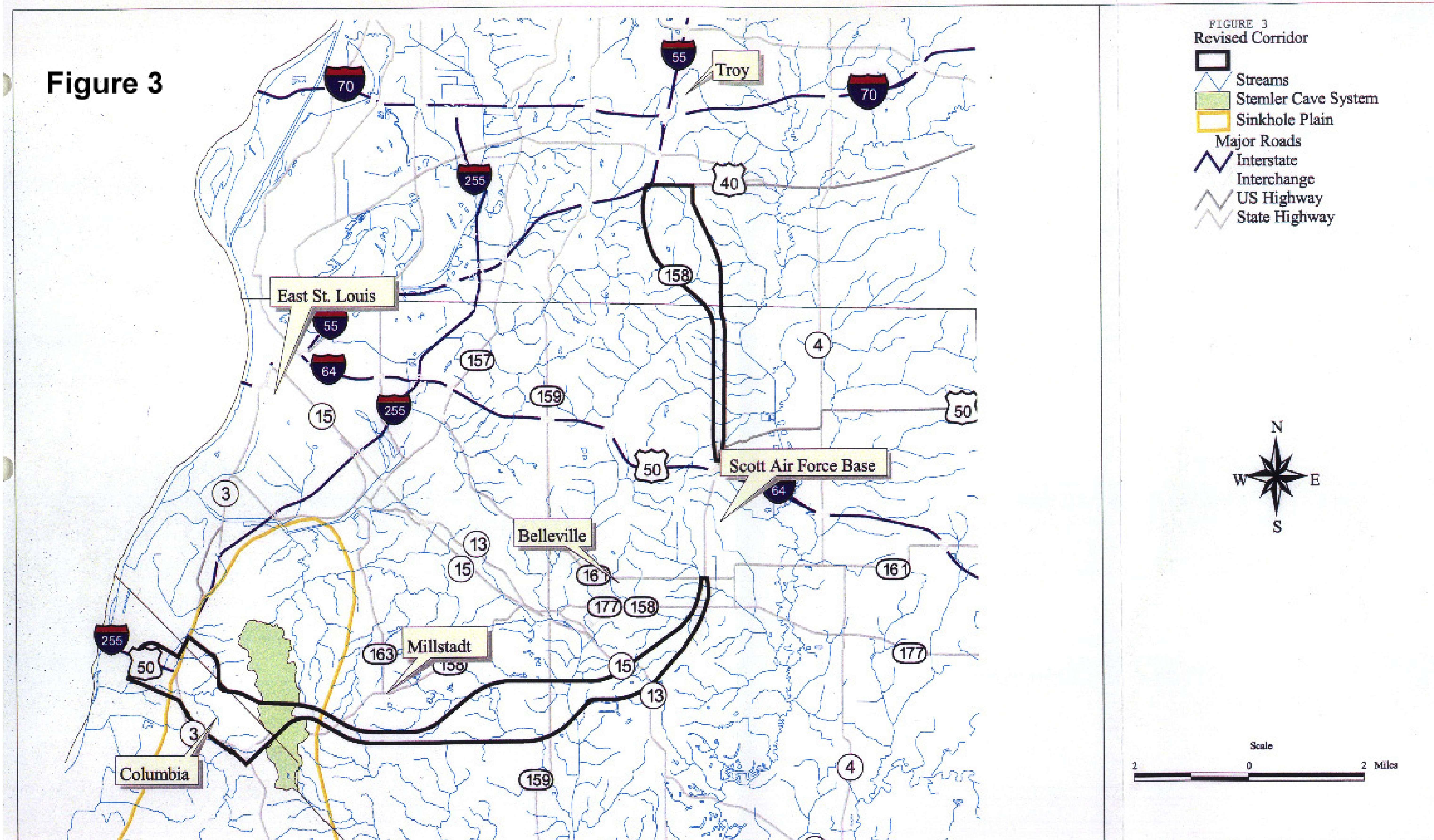
Figure 2



Route 158 Project Corridor

ZAMBRANA Engineering, Inc.

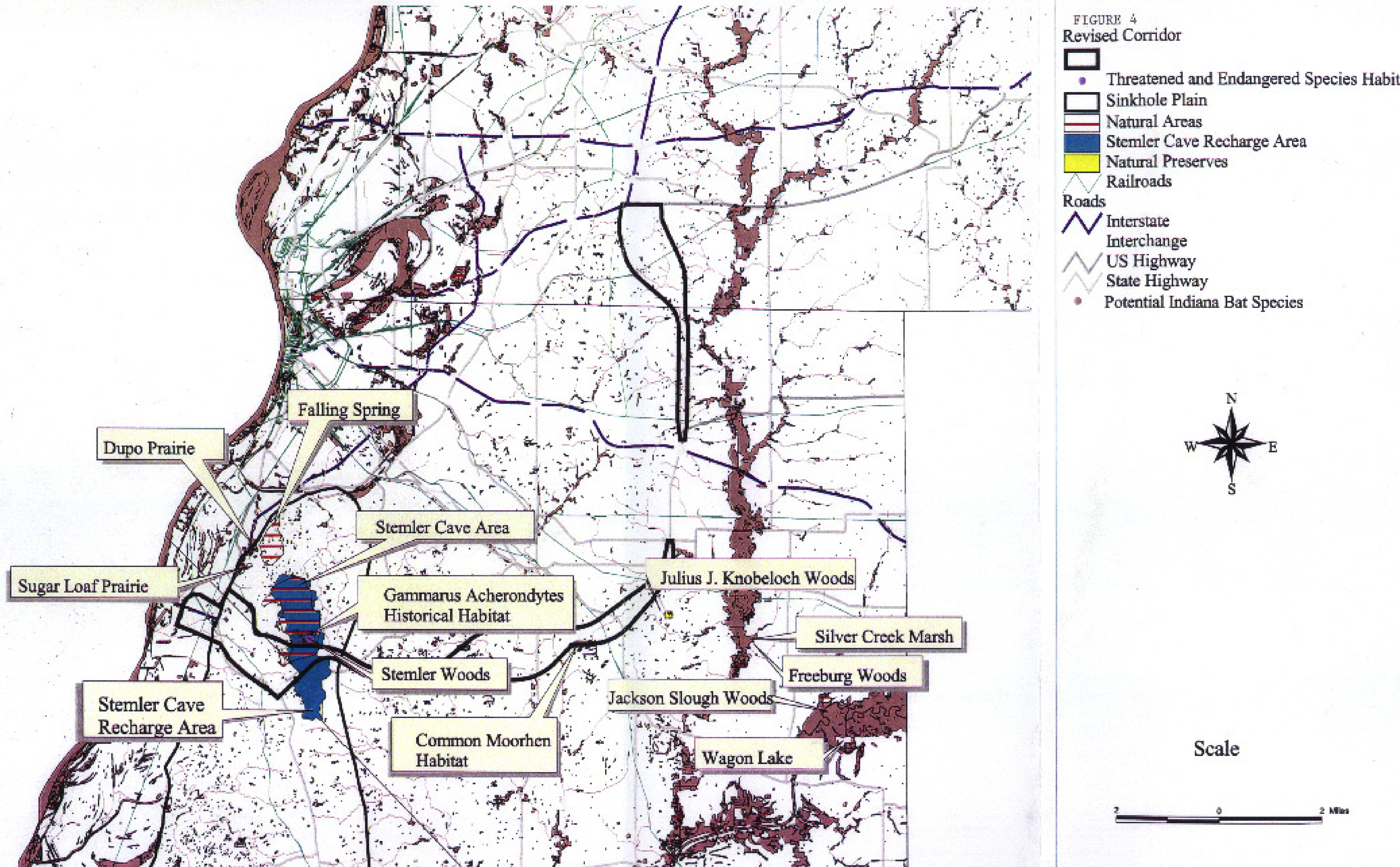
Figure 3



Water Issues in Route 158 Corridor

ZAMBRANA Engineering, Inc.

Figure 4

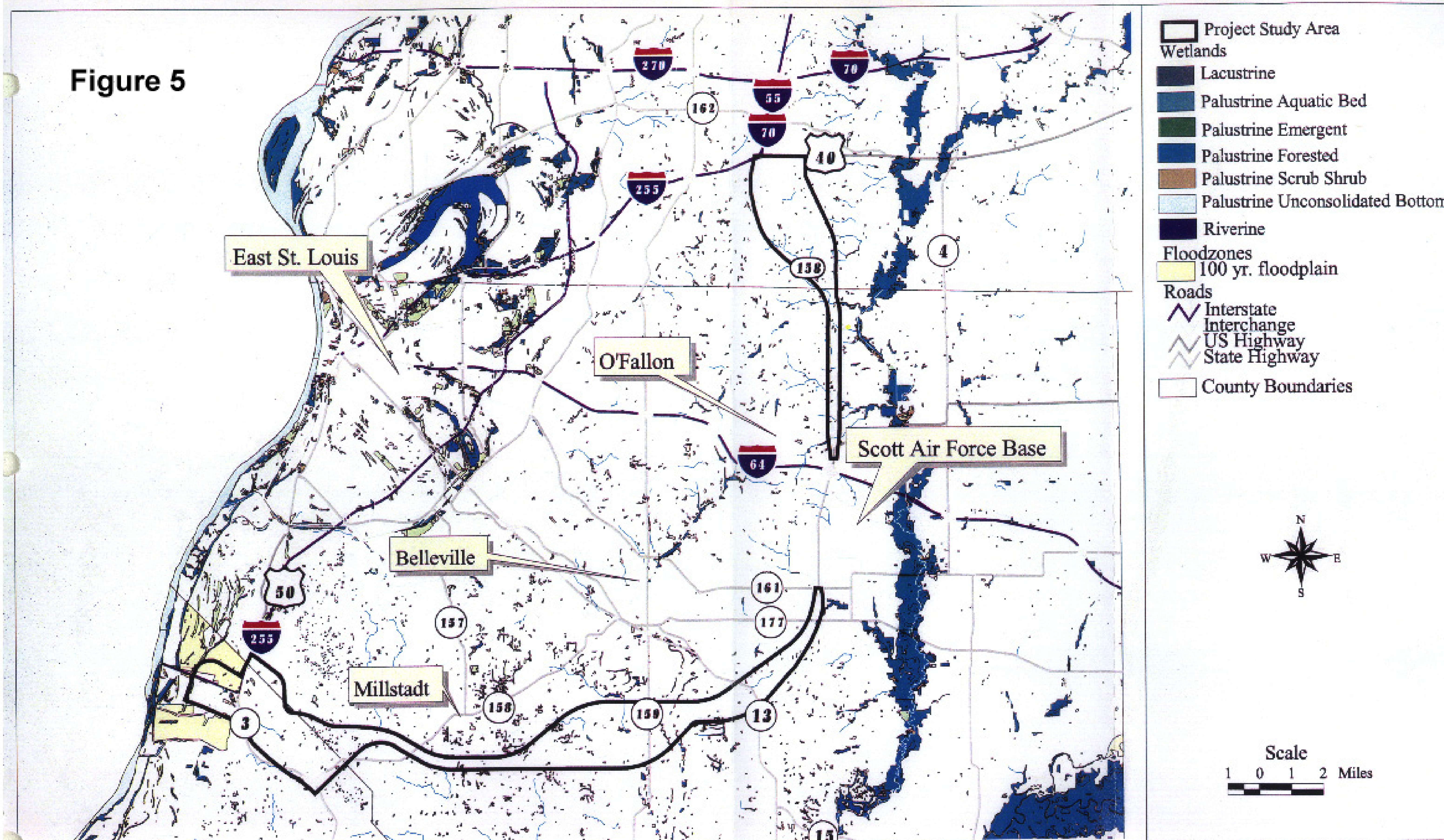


Natural Areas and Threatened and Endangered Species on Route 158 Corridor

ZAMBRANA Engineering, Inc.

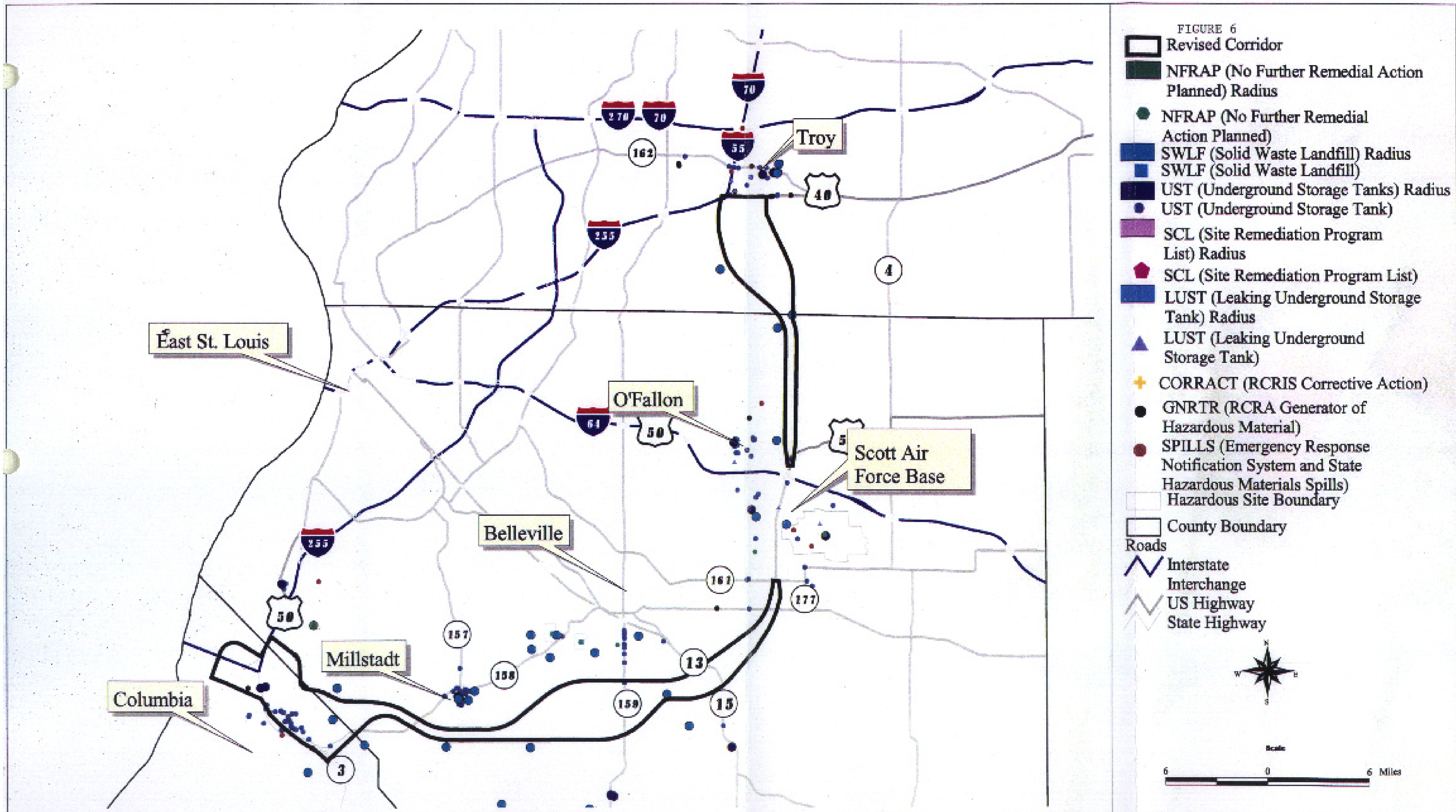
FIGURE 5

Figure 5



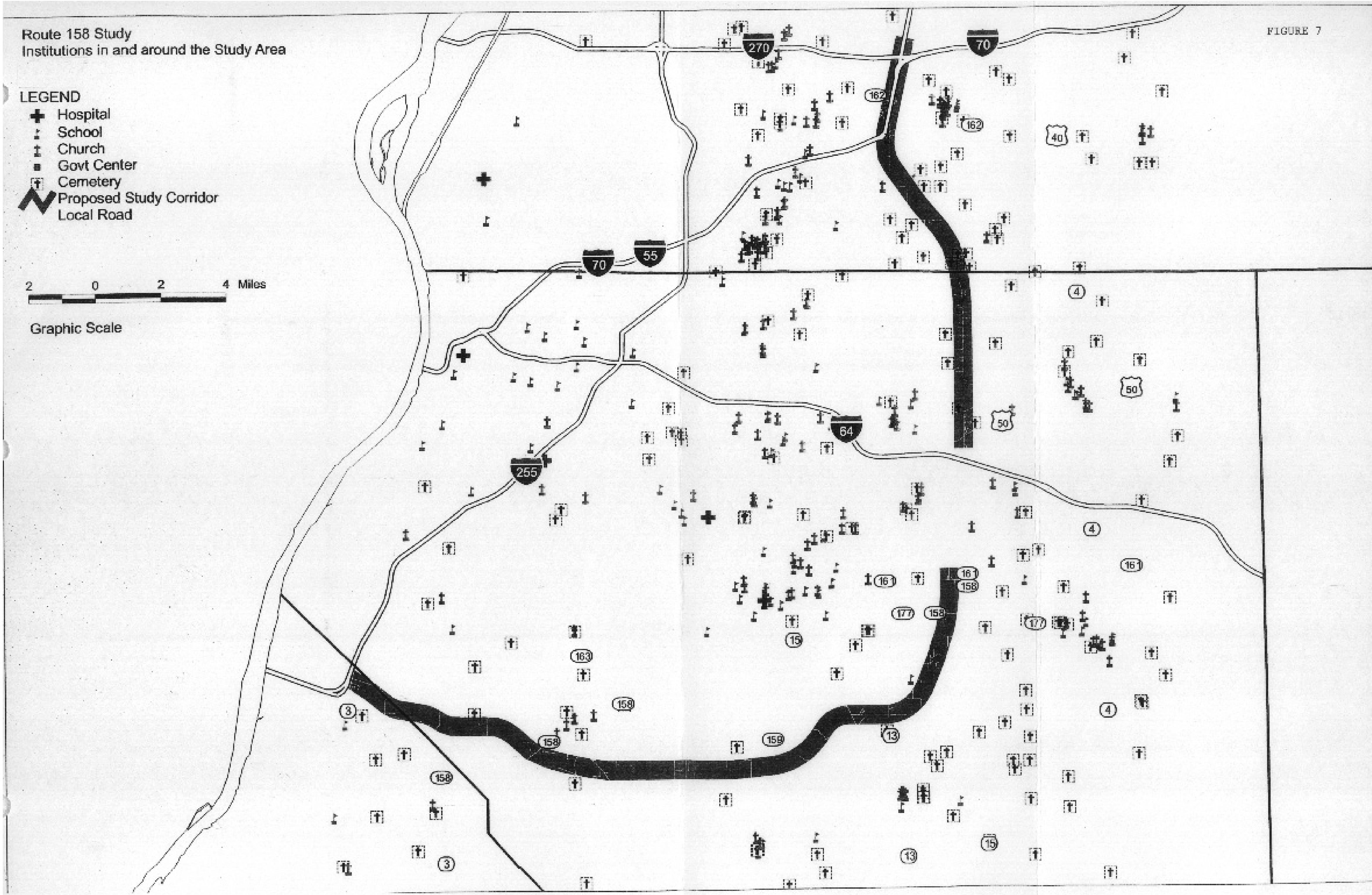
Wetland Issues in Route 158 Corridor

ZAMBRANA Engineering, Inc.



Hazardous Waste Sites in the Route 158 Corridor

ZAMBRANA Engineering, Inc.


Route 158 Study
Institutions in and around the Study Area
FIGURE 7
LEGEND
Hospital
School
Church
Govt Center
Cemetery
Proposed Study Corridor
Local Road
2 0 2 4 Miles
Graphic Scale
270
70
55
255
64
40
50
162
161
158
177
163
159
15
13
4
3

ATTACHMENT A
FIELD TRIP PHOTOGRAPHS

Photo 1: Cemetery looking north from W. Mill Creek Rd.

Photo 2: Pond to east of cemetery on W. Mill Creek Rd.

Photo 3: Wooded area just south of cemetery, looking north from Liberty Rd.

Photo 4: Wooded area just south of cemetery, looking south from Liberty Rd.

Photo 5: Fields and wooded areas looking southeast from Lebanon Rd.

Photo 6: Fields and wooded areas looking northwest from Lebanon Rd.

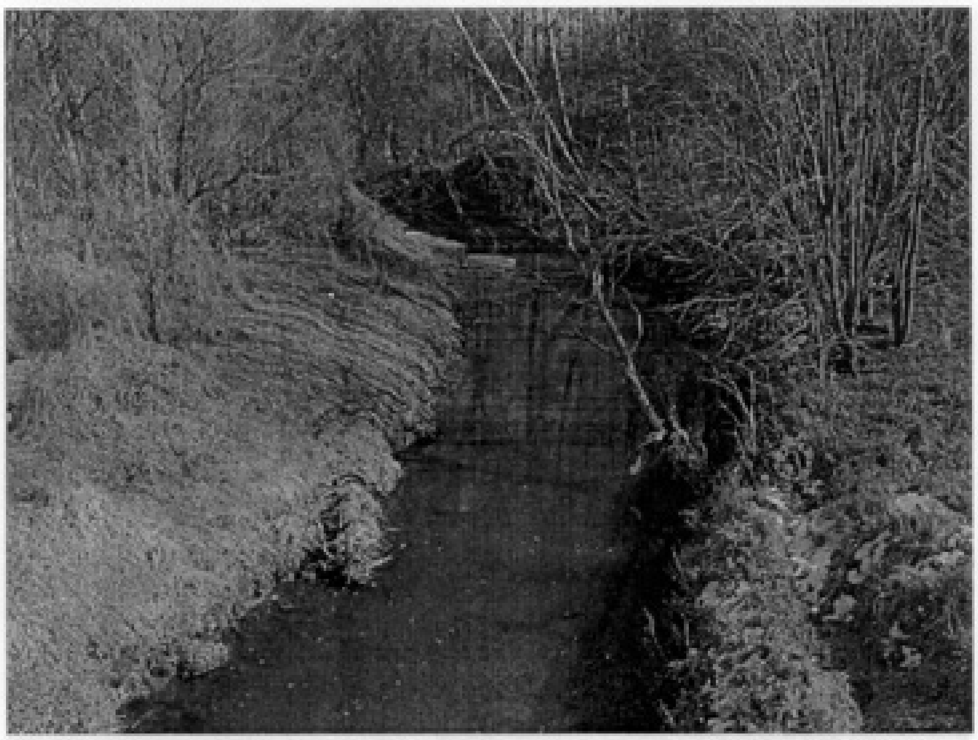


Photo 7: Ogles Creek locking east from IL-50 just south of Old Lebanon Rd.

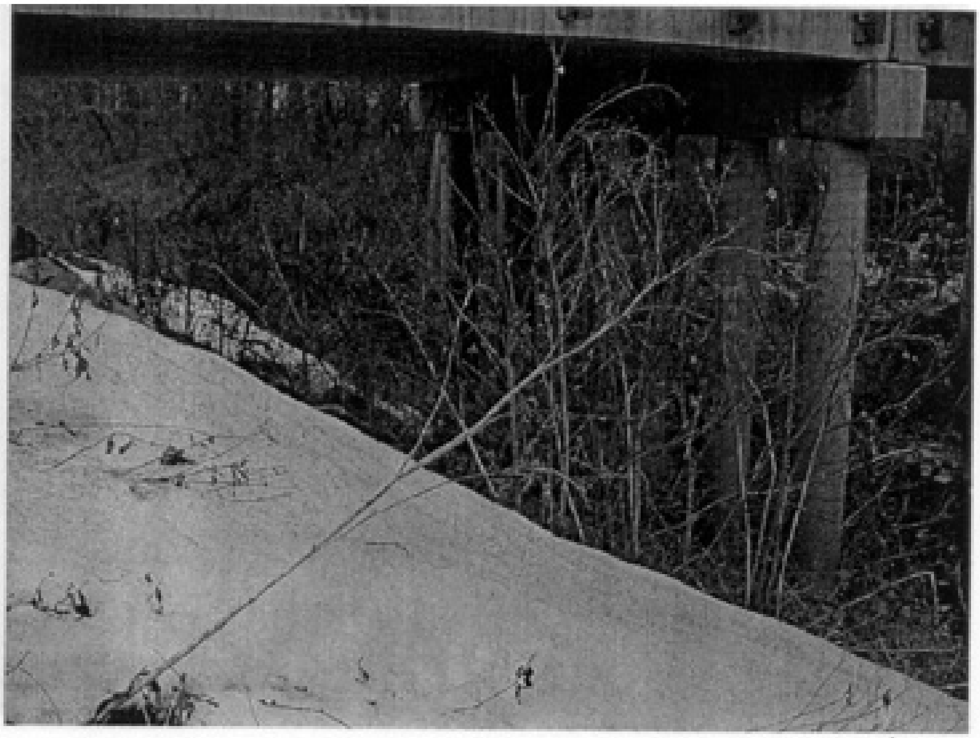


Photo 8: West bank along Richland Creek looking north near Schueten German Rd. bridge.

Photo 9: West bank of Richland Creek looking south near Schueten German Rd. bridge.

Photo 10: Potential wetland on east bank of Richland Creek near Schueten German Rd. bridge.

Photo 11. Looking north from Douglas Road into wetland area along Douglas Creek Tributary.

Photo 12. Douglas Creek tributary and wooded area looking north from Douglas Rd.

A.2 CONCEPTUAL DESIGN

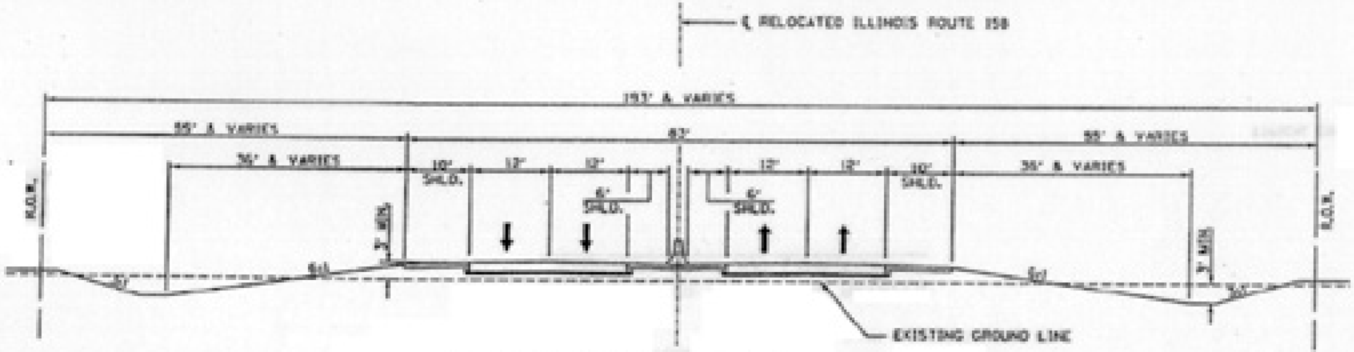
A.2 CONCEPTUAL DESIGN

The conceptual design was based on the general physical design standards used by the Illinois Department of Transportation. Concept level plans and typical cross-sections were prepared. In some cases, alternative corridor concepts were developed based on municipal input. Similarly, alternative connection concepts at the north and west ends of the proposed facility were developed.

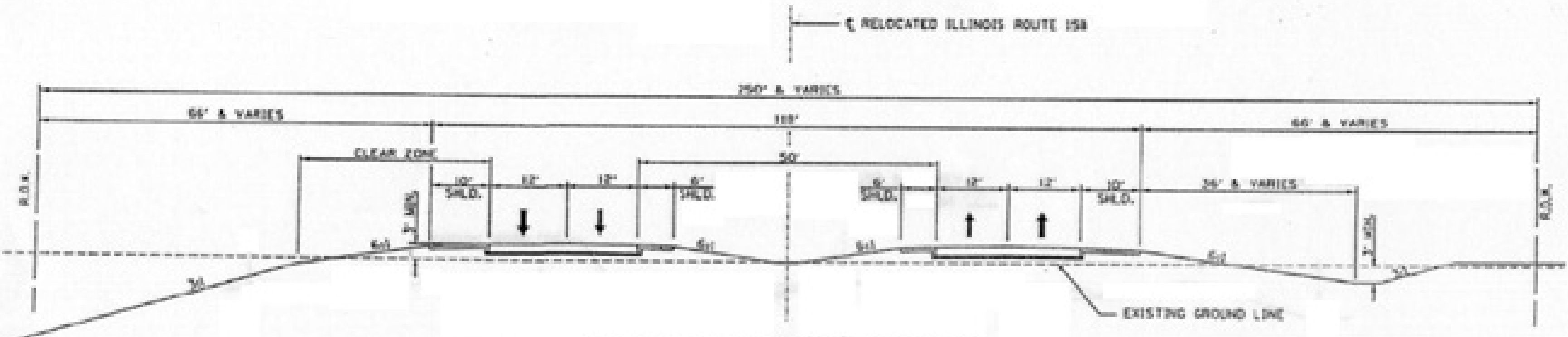
DESIGN CRITERIA

NEW EXPRESSWAY CONSTRUCTION

Design Speed (MPH)	70
Maximum D_c	2° 45'
Minimum R	2083.48'
Maximum S.E.	6.00%
Maximum Grade	3% Level 4% Rolling
Access Control	Partial
Minimun R/W Width	250' 193' (W/ CMB Median)
Median Width	50'
Traffic Lanes	4
Shoulder Width	
Main Lane	10' Rt. W/ Full Paved 6' Lt. W/ 4' Paved
Ramp	8' Rt. W/ 6' Paved 6' Lt. W/ 4' Paved
Vertical Clearance over Highway	16' - 3"
Vertical Clearance over Railroad	23' - 0"
Vertical Clearance over Waterway	Design H.W. + 2' F.B.



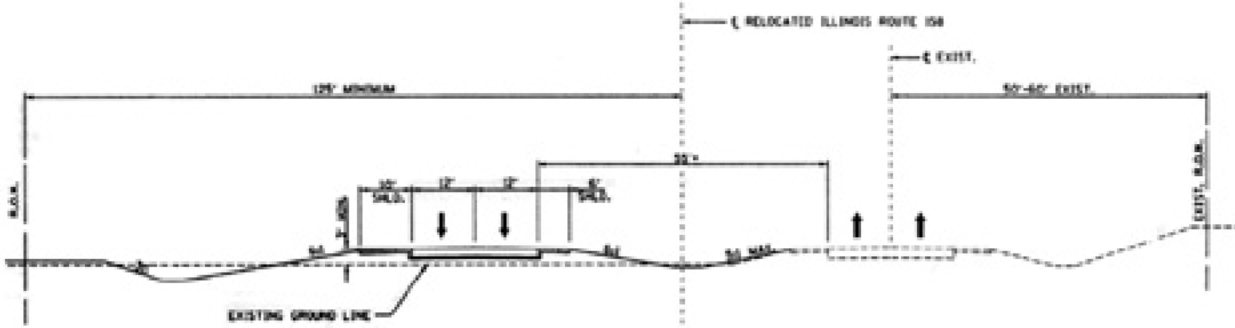
PROPOSED TYPICAL SECTION "A"



PROPOSED TYPICAL SECTION "B"

NOTE:

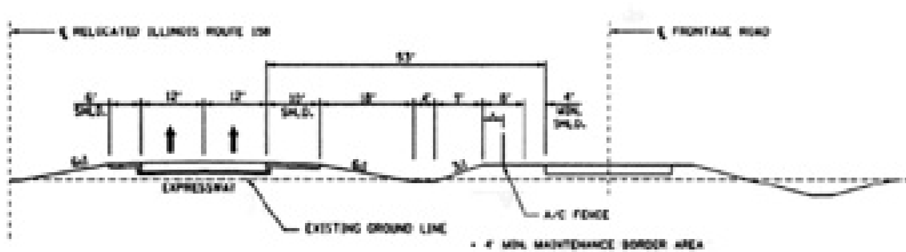
ROADWAY FILL SHOULD BE CONSTRUCTED A MINIMUM OF 3' ABOVE SURROUNDING GROUND LINE.



PROPOSED TYPICAL SECTION "C"
REUSING EXISTING ROADWAY

NOTE:

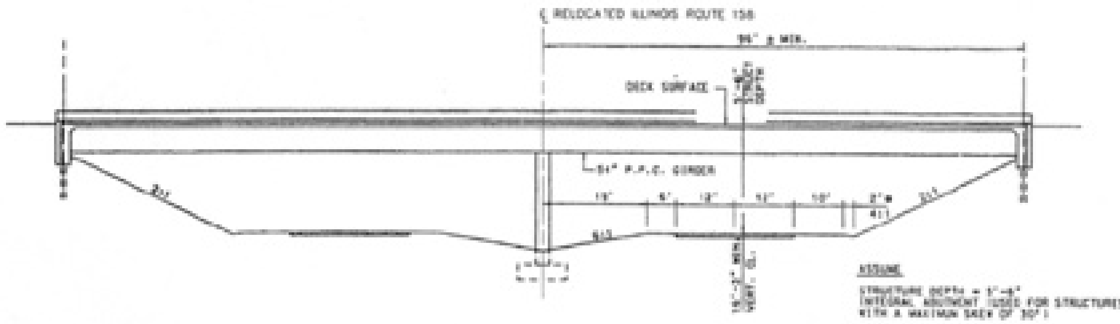
* ADDITIONAL WIDTH PROVIDED TO ACCOMMODATE PROFILE DIFFERENCES BETWEEN ROADS. (WILL ALSO ALLOW FUTURE CONVERSION OF EXIST. [illegible] TO FRONTAGE ROAD)



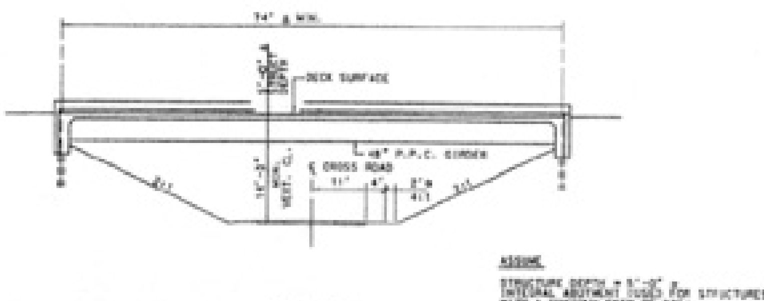
TYPICAL OUTER SEPARATION BETWEEN
FRONTAGE ROAD AND EXPRESSWAY

NOTE:

ROADWAY FILL SHOULD BE CONSTRUCTED A MINIMUM OF 3' ABOVE SURROUNDING GROUND LINE.



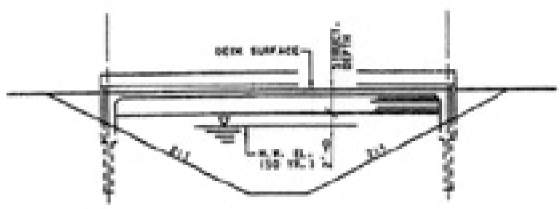
ELEVATION
CROSS ROAD OVER ILL-158



ELEVATION
ILL-158 OVER CROSS ROAD

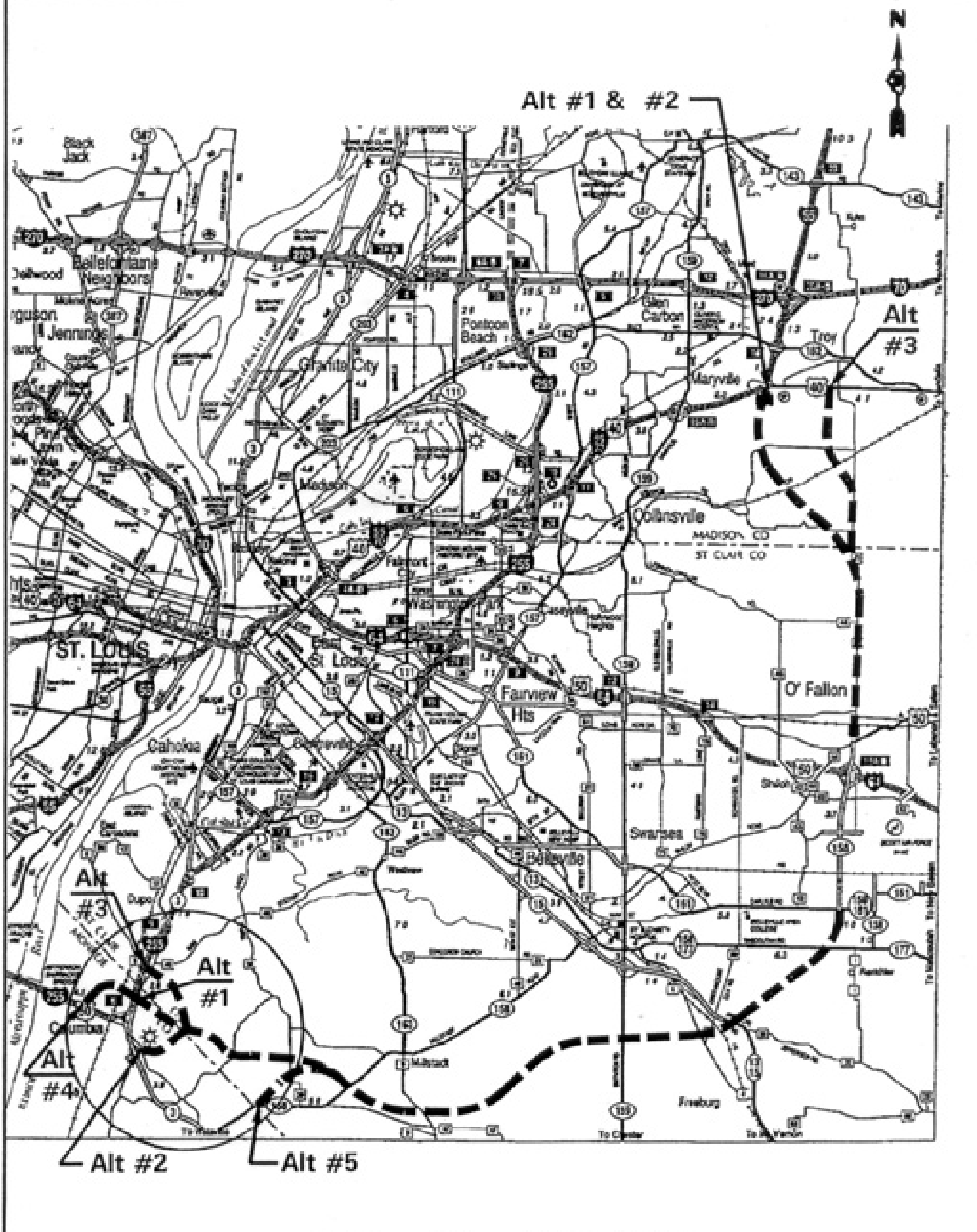
TYPICAL BRIDGE ELEVATIONS

Illinois 158 Outer Belt Feasibility Study



ELEVATION

TYPICAL BRIDGE ELEVATION



INTERCHANGE ALTERNATIVES

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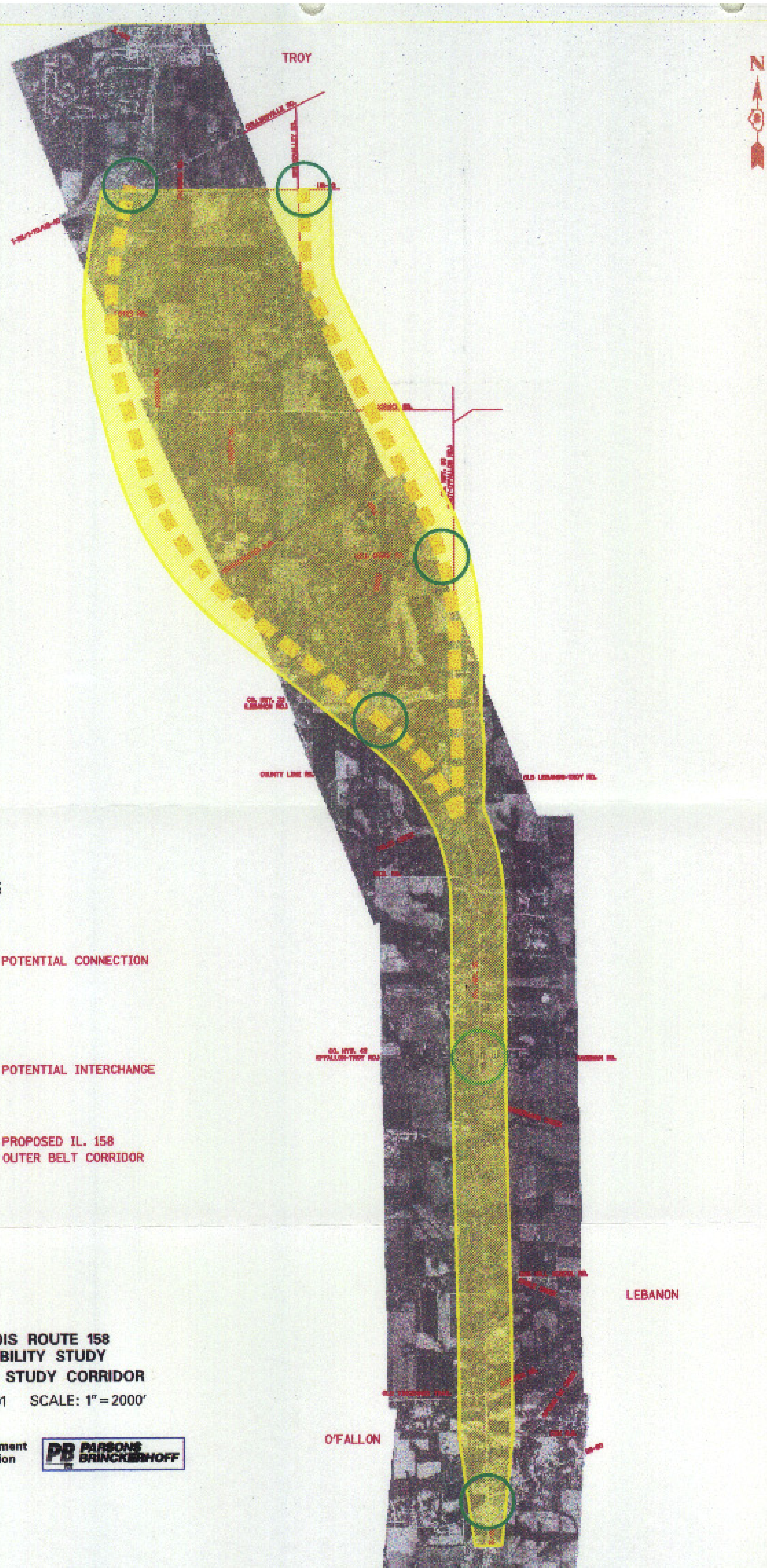
PLUSES	MINUSES
Interchange Alternative #1: (Build New Interchange) - Freeway to freeway connection - All right-hand proposed ramps	- High cost of construction ($18M)
Interchange Alternative #2: (Utilize Quarry Road Interchange) - No work will proceed at existing interchange - Low cost of construction ($913K)	- Not freeway to freeway connection - Require to relocate Quarry/Ghent and Palmer/Ghent Intersections
Interchange Alternative #3: (Utilize County Highway 6 Bridge) - All right-hand proposed ramps - Less cost of construction ($3.8M) than costs of Alt. #1 and #4 - Utilize existing bridge, only widening needed	- Not freeway to freeway connection - NB exit and entrance ramps connect to and from Old Illinois Route 3
Interchange Alternative #4: (Utilize Fish Lake Bridge) - Utilize existing bridge, only widening needed	- Not freeway to freeway connection - High cost of construction ($14M) - SB I-255 to EB IL-158 traffic will travel to west, pass I-255/US-50 interchange, turn back and cross over I-255, then go to east (Total loop distance approx. 2.8 miles)
Interchange Alternative #5: (Utilize Existing IL-158/IL-3 Interchange) - Freeway to freeway connection - No work will proceed at existing interchange - Low cost of construction ($481K) - Save construction cost for IL-158 (3.4 miles less in length than Alt. #1)	- Additional traffic will add on IL-3 - Interchange located in City south side (Traffic will travel 1.9 miles more than Alt. #1 to existing I-255/US-50/IL-3 interchange)



LEGEND:

POTENTIAL CONNECTION

POTENTIAL INTERCHANGE

PROPOSED IL. 158
OUTER BELT CORRIDOR

ILLINOIS ROUTE 158
FEASIBILITY STUDY
PROPOSED STUDY CORRIDOR

MARCH 2001 SCALE: 1" = 2000'

Illinois Department of Transportation

PB PARSONS BRINCKERHOFF

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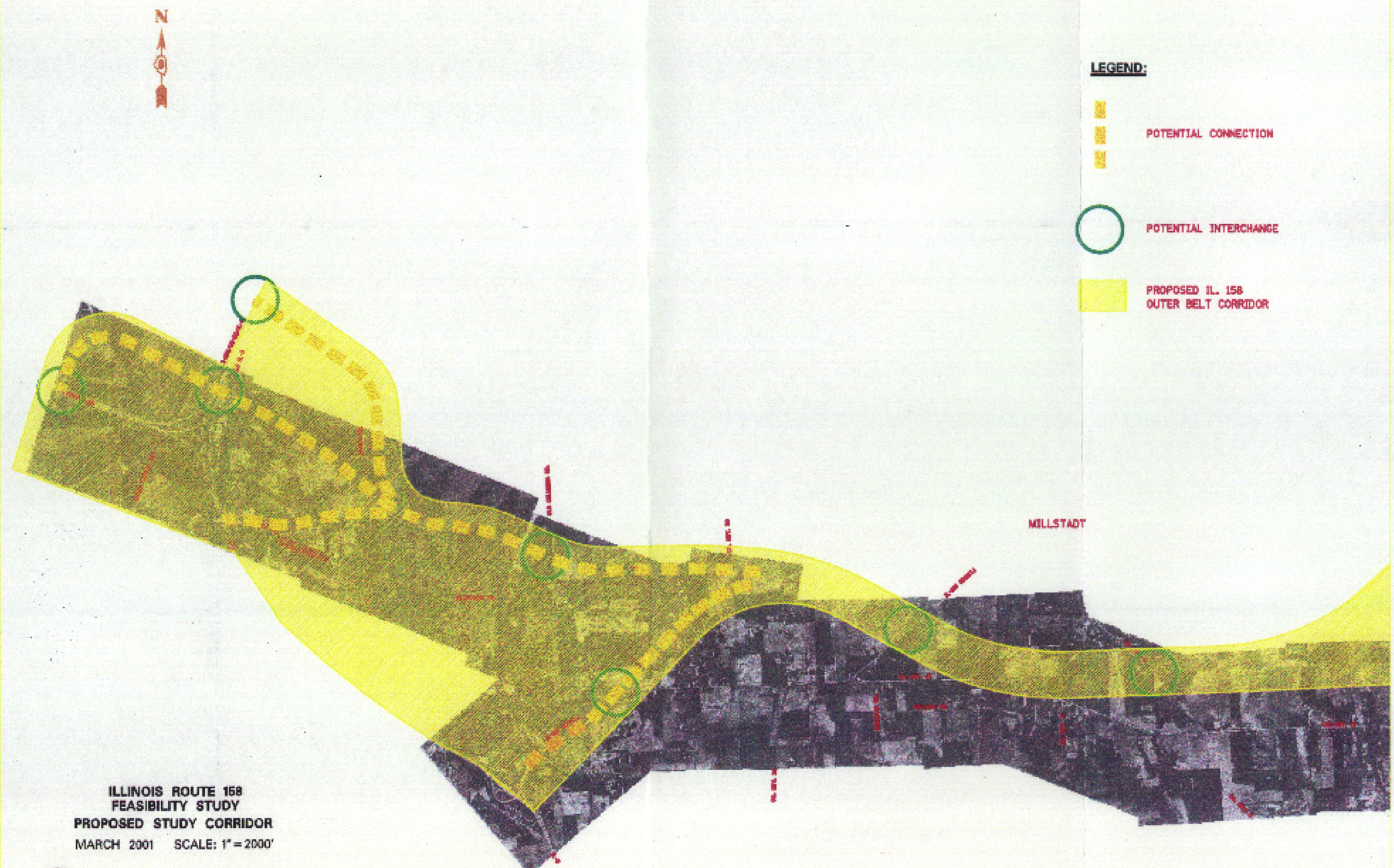

ILLINOIS ROUTE 158
FEASIBILITY STUDY
PROPOSED STUDY CORRIDOR

MARCH 2001 SCALE: 1" = 2000'

Illinois Department of Transportation

PB PARSONS BRINCKERHOFF

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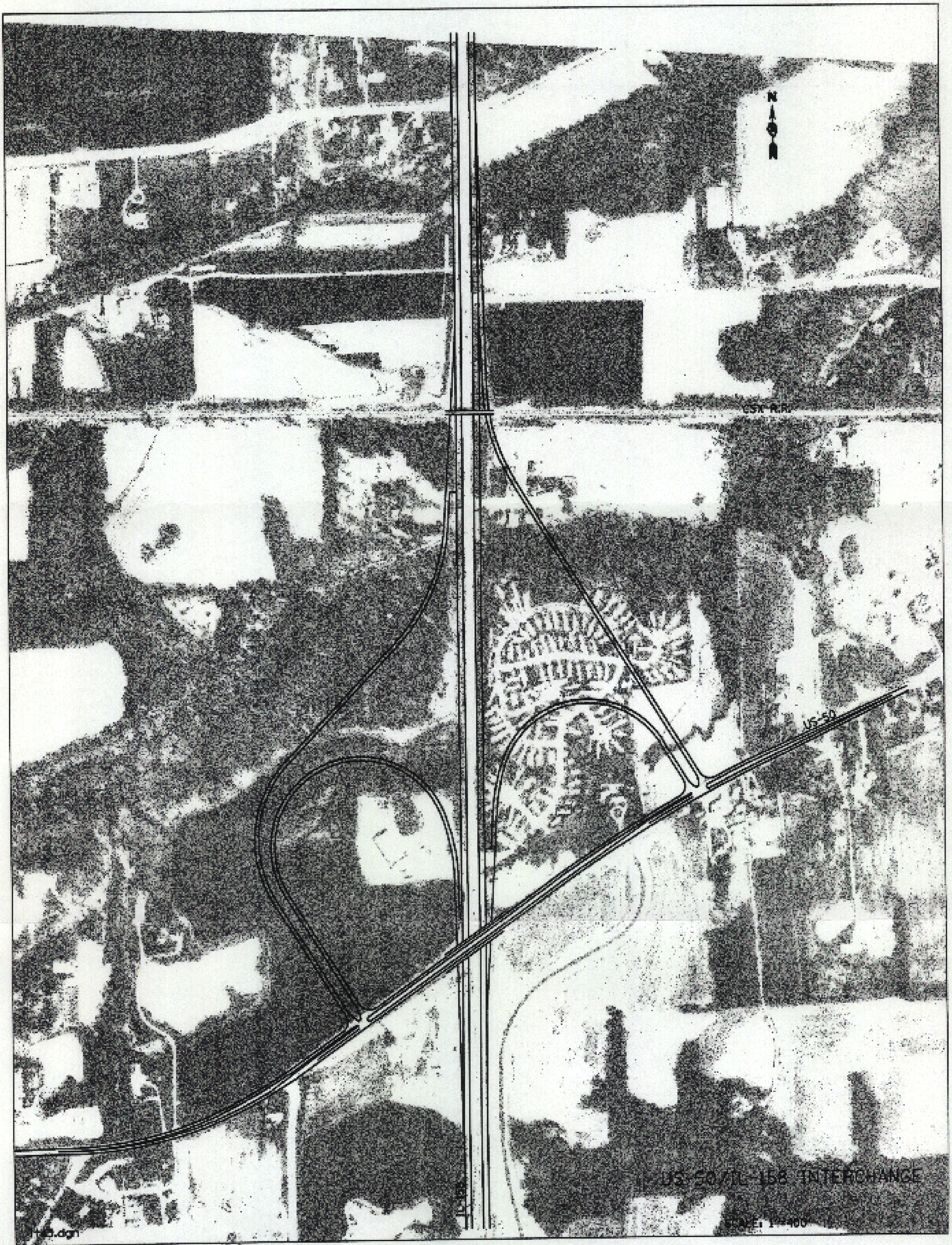

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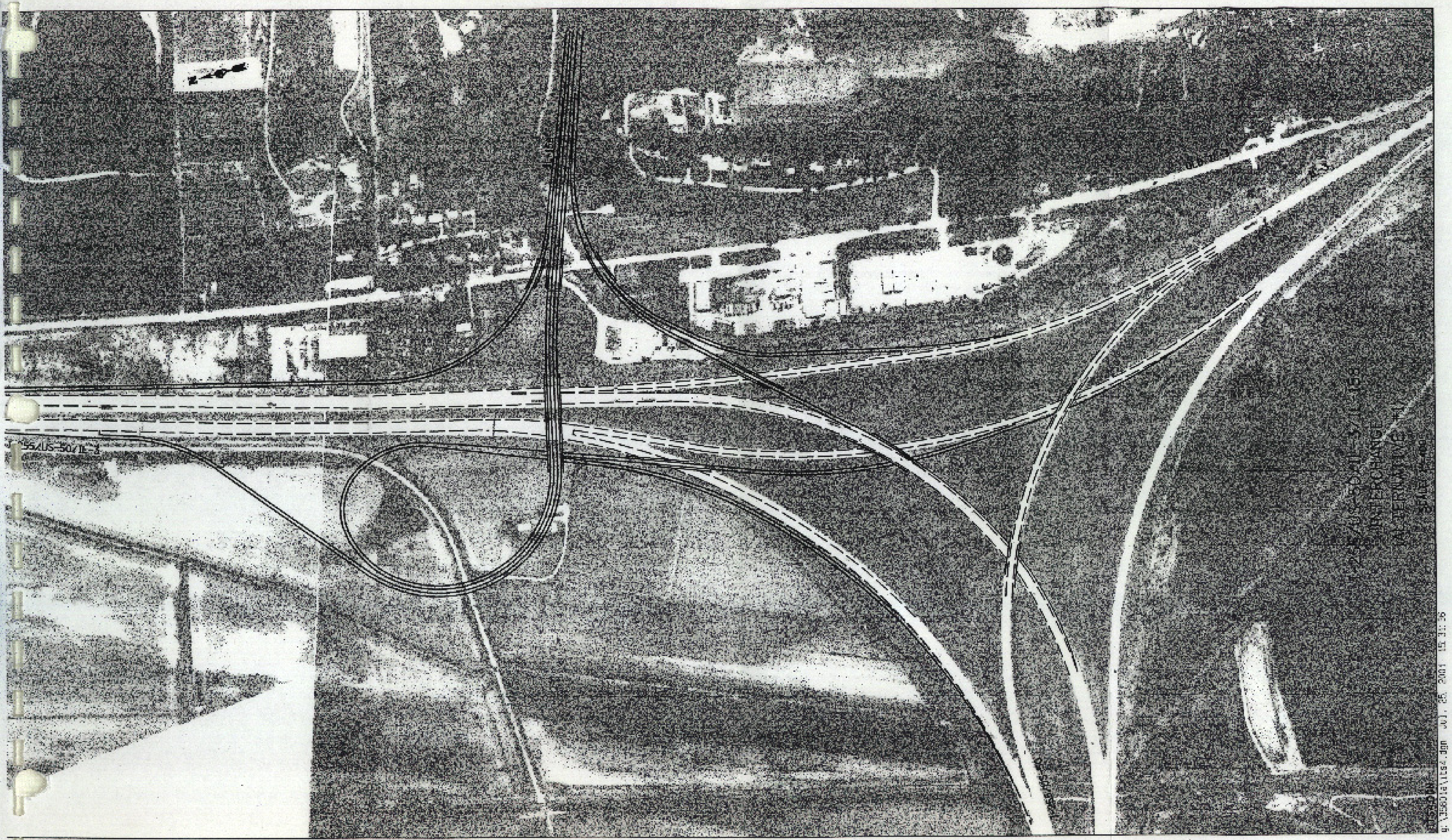

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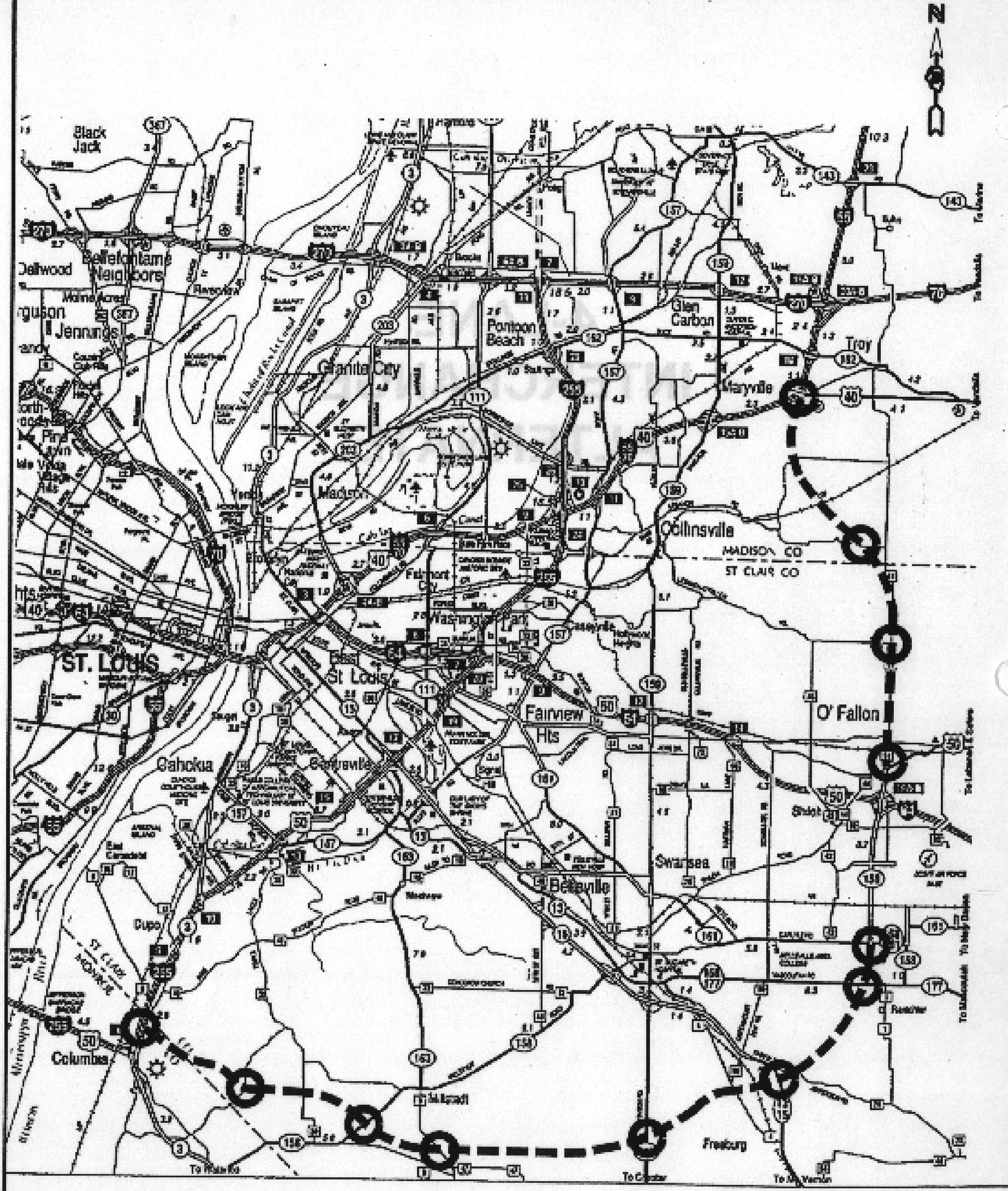
A.3 CONCEPTUAL COST ESTIMATES

A.3 CONCEPTUAL COST ESTIMATES

For capital costing, unit cost pricing for preparation of conceptual capital cost estimates was performed for each alternative. Typical unit prices appropriate for the Southwestern Illinois region were developed and applied, based on previous studies and experience from other similar metropolitan areas. A contingency factor of 25 percent was used for the construction costs. Preliminary engineering and construction engineering were assumed to be 15% of the construction cost. Estimated right-of-way and utility costs were then added. The resulting conceptual capital cost estimates are summarized and documented below for each alternative.

4-LANE INTERCHANGE ALTERNATE



PROPOSED INTERCHANGE

INTERCHANGE ALTERNATE

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ILLINOIS ROUTE 158 FEASIBILITY STUDY
4-LANE / INTERCHANGE ALTERNATE

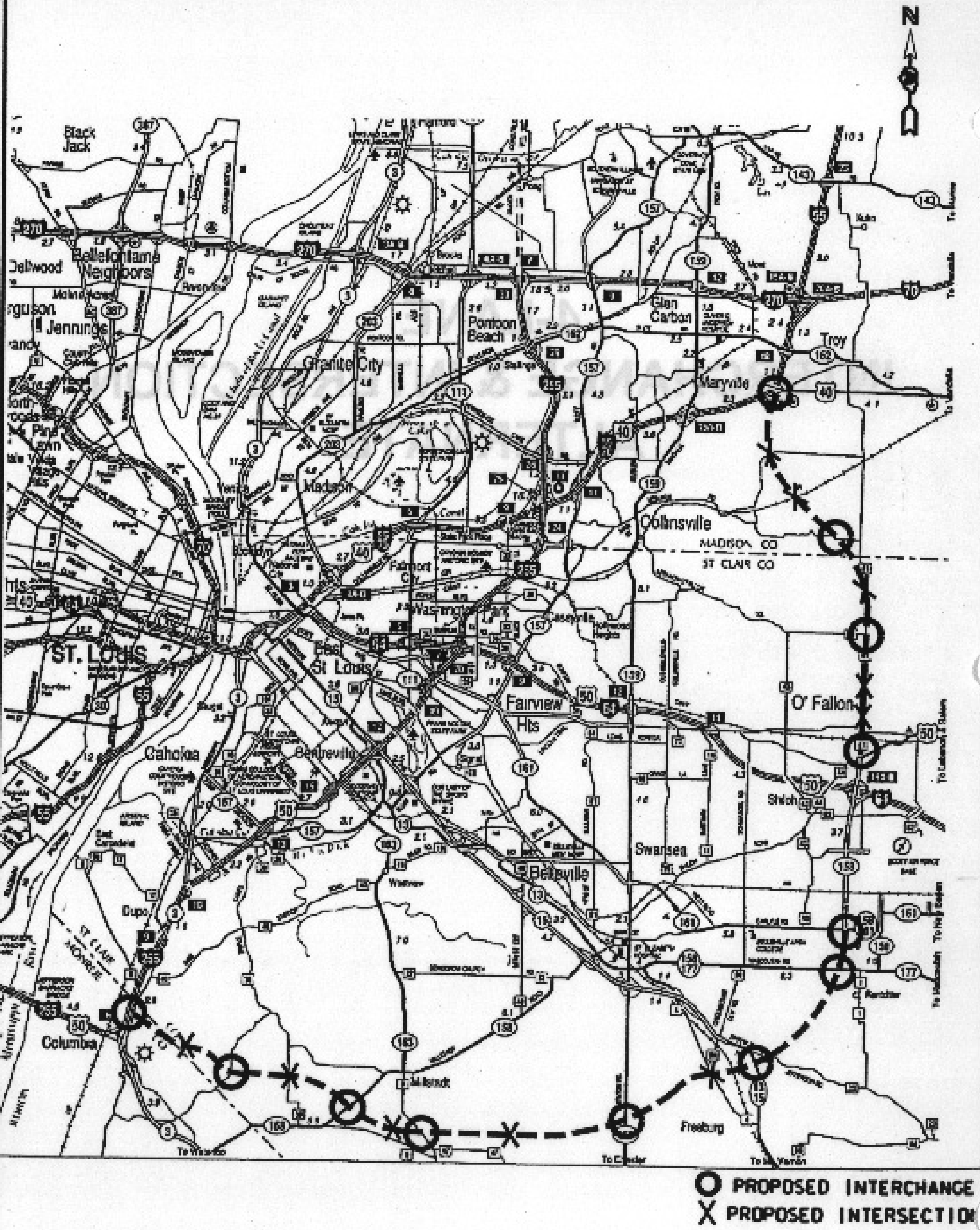
INTERCHANGE	DISTANCE FT. / MILES	LANES	COSTS (ROADWAY ONLY)	COSTS
I-55/I-70/US-40 (Alt. #1)				$19,288,000
	23,771 / 4.50	4	$8,652,205	
Co. Hwy. 32 (Lebanon Rd.)				$3,639,000
	13,847 / 2.62	4	$5,895,727	
Co. Hwy. 43 (O'Fallon-Troy Rd.)				$3,639,000
	16,666 / 3.16	4	$7,095,991	
US-50				$4,306,000
	3,877 / 0.73	4 (Exist.)	$0	
I-64 (Exist.)				$0
	20,042 / 3.80	4 (Exist.)	$0	
IL-161 (Carlyle Rd.)				$3,639,000
	5,503 / 1.04	4	$2,343,048	
IL-177 (Mascoutah Ave.)				$3,639,000
	16,627 / 3.15	4	$7,079,386	
IL-13/IL-15				$3,639,000
	17,561 / 3.33	4	$7,477,061	
IL-159				$3,639,000
	31,360 / 5.94	4	$13,352,352	
Co. Hwy. 9				$3,639,000
	11,052 / 2.09	4	$4,705,682	
IL-158 Exist.				$3,639,000
	16,700 / 3.16	4	$7,110,468	
Old Columbia Rd.				$3,639,000
	15,892 / 3.01	4	$6,042,620	
I-255/US-50/IL-3 (Alt. #1)				$12,474,000
ROAD BRIDGES *				
Over Roadway				$9,248,000
Over Waterway				$7,252,000
Over Railway				$426,000
RAILROAD BRIDGES *				$308,000
FRONTAGE ROADS				$1,500,000
CLOSED DRAINAGE SYSTEM				$1,500,000
	192,898 / **36.53 Miles**		$69,755,000	$89,053,000
Total				$158,808,000
Contingencies (25%)				$39,702,000
Construction Cost				$198,510,000
Preliminary Engineering & Construction Engineering (15%)				$29,777,000
Right-Of-Way (1580 Acres @$4000)				$6,320,000
Utility Adjustments				$1,000,000
Construction Cost With Engineering				**$235,607,000**

* For Locations And Costs See Page 2

ILLINOIS ROUTE 158 FEASIBILITY STUDY
INTERCHANGE ALTERNATE

	COSTS
<u>ROAD BRIDGES</u>	
Over Roadway:	
- Loyet Rd. (2)	$544,000
- Kirsch Rd. (2)	$544,000
- Mill Creek Rd. (2)	$544,000
- County Line Rd. (2)	$544,000
- Weil Rd. (2)	$544,000
- Borchers Ln./Vincennes Tr. (2)	$544,000
- Plum Hill School Rd. (2)	$544,000
- Jefferson Rd. (2)	$544,000
- Co. Hwy. 4 (2)	$544,000
- Country Side Lane (2)	$544,000
- Schiermeier Rd. (2)	$544,000
- Lunch Rd. (2)	$544,000
- High Prairie School Rd. (2)	$544,000
- Roachtown Rd. (2)	$544,000
- Co. Hwy. 71 (2)	$544,000
- Co. Hwy. 39 (2)	$544,000
- Rueck Rd. (2)	$544,000
	$9,248,000
Over Waterway:	
- Ogles Creek (2)	$1,036,000
- Hagermann Creek (2)	$1,036,000
- Engle Creek (2)	$1,036,000
- Spring Brook Creek (2)	$1,036,000
- Loop Creek (2)	$1,036,000
- Loop Creek (2)	$1,036,000
- Douglas Creek (2)	$1,036,000
	$7,252,000
Over Railway:	
- Consolidated R.R. (2)	$264,000
- IL Central R.R. (2)	$162,000
	$426,000
<u>RAILROAD BRIDGES</u>	
- CSX R.R. (1)	$308,000

4-LANE
INTERCHANGE & INTERSECTION
ALTERNATE



INTERCHANGE & INTERSECTION ALTERNATE

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ILLINOIS ROUTE 158 FEASIBILITY STUDY
4-LANE / INTERCHANGE & INTERSECTION ALTERNATE

INTERCHANGE	DISTANCE FT. / MILES	LANES	COSTS (ROADWAY ONLY)	COSTS
I-55/I-70/US-40 (Alt. #1)				$19,288,000
	23,771 / 4.50	4	$8,652,205	
Co. Hwy. 32 (Lebanon Rd.)				$3,639,000
	13,847 / 2.62	4 *	$4,127,009	
Co. Hwy. 43 (O'Fallon-Troy Rd.)				$3,639,000
	16,666 / 3.16	4 *	$3,547,996	
US-50				$4,306,000
	3,877 / 0.73	4 (Exist.)	$0	
I-64 (Exist.)				$0
	20,042 / 3.80	4 (Exist.)	$0	
IL-161 (Carlyle Rd.)				$3,639,000
	5,503 / 1.04	4	$2,343,048	
IL-177 (Mascoutah Ave.)				$3,639,000
	16,627 / 3.15	4	$7,079,386	
IL-13/IL-15				$3,639,000
	17,561 / 3.33	4	$7,477,061	
IL-159				$3,639,000
	31,360 / 5.94	4	$13,352,352	
Co. Hwy. 9				$3,639,000
	11,052 / 2.09	4	$4,705,682	
IL-158 Exist.				$3,639,000
	16,700 / 3.16	4	$7,110,468	
Old Columbia Rd.				$3,639,000
	15,892 / 3.01	4	$6,042,620	
I-255/US-50/IL-3 (Alt. #1)				$12,474,000
ROAD BRIDGES **				
Over Roadway				$4,352,000
Over Waterway				$5,180,000
Over Railway				$426,000
RAILROAD BRIDGES **				$308,000
INTERSECTIONS **				$2,700,000
CLOSED DRAINAGE SYSTEM				$1,500,000
	192,898 / **36.53 Miles**		$64,438,000	$83,285,000

Total	$147,723,000
Contingencies (25%)	$36,931,000
Construction Cost	$184,654,000
Preliminary Engineering & Construction Engineering (15%)	$27,698,000
Right-Of-Way (1520 Acres @$4000)	$6,080,000
Utility Adjustments	$1,000,000
Construction Cost With Engineering	**$219,432,000**

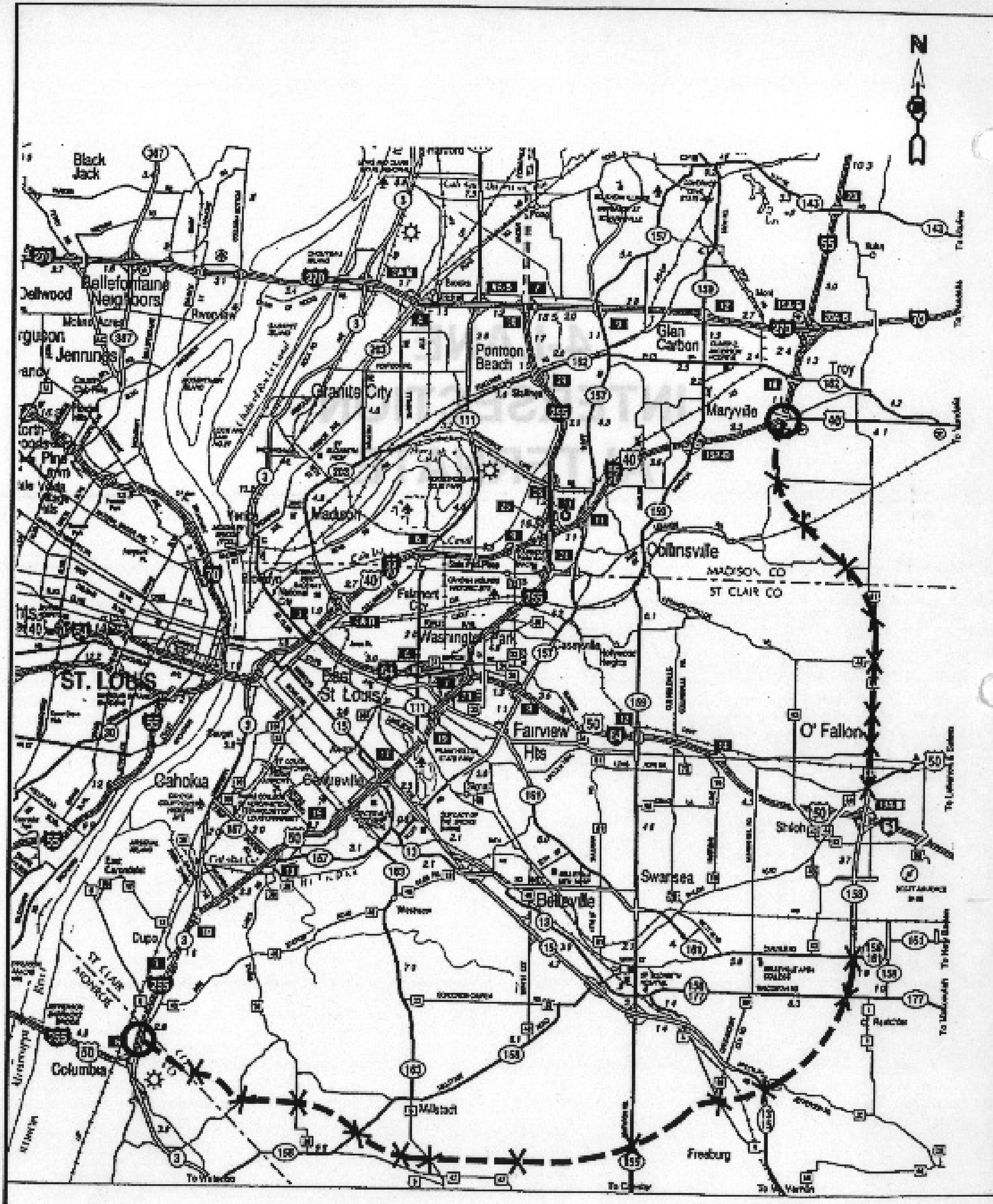
* Build Four Lanes Initially - Using Existing Roadway

**For Locations And Costs See Page 2

ILLINOIS ROUTE 158 FEASIBILITY STUDY
INTERCHANGE & INTERSECTION ALTERNATE

	COSTS
<u>ROAD BRIDGES</u>	
Over Roadway:	
- Loyet Rd. (2)	$544,000
- County Line Rd. (2)	$544,000
- Plum Hill School Rd. (2)	$544,000
- Jefferson Rd. (2)	$544,000
- Country Side Lane (2)	$544,000
- Schiermeier Rd. (2)	$544,000
- Lunch Rd. (2)	$544,000
- High Prairie School Rd. (2)	$544,000
	$4,352,000
Over Waterway:	
- Ogles Creek (1)	$518,000
- Hagermann Creek (1)	$518,000
- Engle Creek (1)	$518,000
- Spring Brook Creek (1)	$518,000
- Loop Creek (2)	$1,036,000
- Loop Creek (2)	$1,036,000
- Douglas Creek (2)	$1,036,000
	$5,180,000
Over Railway:	
- Consolidated R.R. (2)	$264,000
- IL Central R.R. (2)	$162,000
	$426,000
<u>RAILROAD BRIDGES</u>	
- CSX R.R. (1)	$308,000
<u>INTERSECTIONS</u>	
- Kirsch Rd.	$240,000
- Mill Creek Rd.	$240,000
- Weil Rd.	$240,000
- Oak High School Rd.	$240,000
- Borchers Ln./Vincennes Tr.	$240,000
- Co. Hwy. 4	$340,000
- Roachtown Rd.	$240,000
- Co. Hwy. 71	$340,000
- Co. Hwy. 39	$340,000
- Rueck Rd.	$240,000
	$2,700,000

4-LANE INTERSECTION ALTERNATE



INTERSECTION ALTERNATE

ILLINOIS ROUTE 158 FEASIBILITY STUDY
4-LANE / INTERSECTION ALTERNATE

INTERSECTION	DISTANCE FT. / MILES	LANES	COSTS (ROADWAY ONLY)	COSTS
I-55/I-70/US-40 (Interchange Alt.#1)				$19,288,000
	8,350 / 1.58	4	$2,086,305	
Kirsch Rd.				$240,000
	6,000 / 1.14	4	$2,554,659	
Mill Creek Rd.				$340,000
	9,421 / 1.78	4	$4,011,241	
Co. Hwy. 32 (Lebanon Rd.)				$240,000
	7,047 / 1.33	4	$2,678,661	
Weil Rd.				$240,000
	6,800 / 1.29	4 *	$1,447,640	
Co. Hwy. 43 (O'Fallon-Troy Rd.)				$340,000
	7,300 / 1.38	4 *	$1,554,084	
Oak High School Rd.				$240,000
	5,300 / 1.00	4 *	$1,128,308	
Borchers Ln./Vincennes Tr.				$240,000
	4,066 / 0.77	4 *	$865,604	
US-50				$340,000
	3,877 / 0.73	4 (Exist.)	$0	
I-64 (Exist.)				$0
	4,500 / 0.85	4 (Exist.)	$0	
Co. Hwy. 82 (Maple St.) (Exist.)				$0
	4,992 / 0.95	4 (Exist.)	$0	
Seibert Rd. (Exist.)				$0
	10,550 / 2.00	4 (Exist.)	$0	
IL-161 (Carlyle Rd.)				$340,000
	5,503 / 1.04	4	$2,343,048	
IL-177 (Mascoutah Ave.)				$340,000
	16,627 / 3.15	4	$7,079,386	
IL-13/IL-15				$340,000
	5,800 / 1.10	4	$2,469,504	
Co. Hwy 4				$340,000
	11,761 / 2.23	4	$5,007,558	
IL-159				$340,000
	18,000 / 3.41	4	$7,663,977	
Roachtown Rd.				$240,000
	13,360 / 2.53	4	$5,688,374	
Co. Hwy. 9				$340,000
	4,050 / 0.77	4	$1,724,395	
Co. Hwy. 71				$340,000
	7,002 / 1.33	4	$2,981,287	
IL-158 Exist.				$340,000
	8,350 / 1.58	4	$3,555,234	
Co. Hwy. 39				$340,000
	8,350 / 1.58	4	$3,555,234	
Old Columbia Rd.				$240,000
	9,192 / 1.74	4	$3,913,738	
Rueck Rd.				$240,000
	6,700 / 1.27	4	$2,128,883	
I-255/US-50/IL-3 (Interchange Alt.#1)				$12,474,000
ROAD BRIDGES **				
Over Roadway				$4,352,000
Over Waterway				$5,180,000
Over Railway				$426,000
RAILROAD BRIDGES **				$308,000
CLOSED DRAINAGE SYSTEM				$1,500,000
	192,898 **36.53**	**Miles**	$64,437,000	$49,528,000
Total				$113,965,000
Contingencies (25%)				$28,491,000
Construction Cost				$142,456,000
Preliminary Engineering & Construction Engineering (15%)				$21,368,000
Right-Of-Way (1206 Acres @$4000)				$4,824,000
Utility Adjustments				$1,000,000
Construction Cost With Engineering				**$169,648,000**

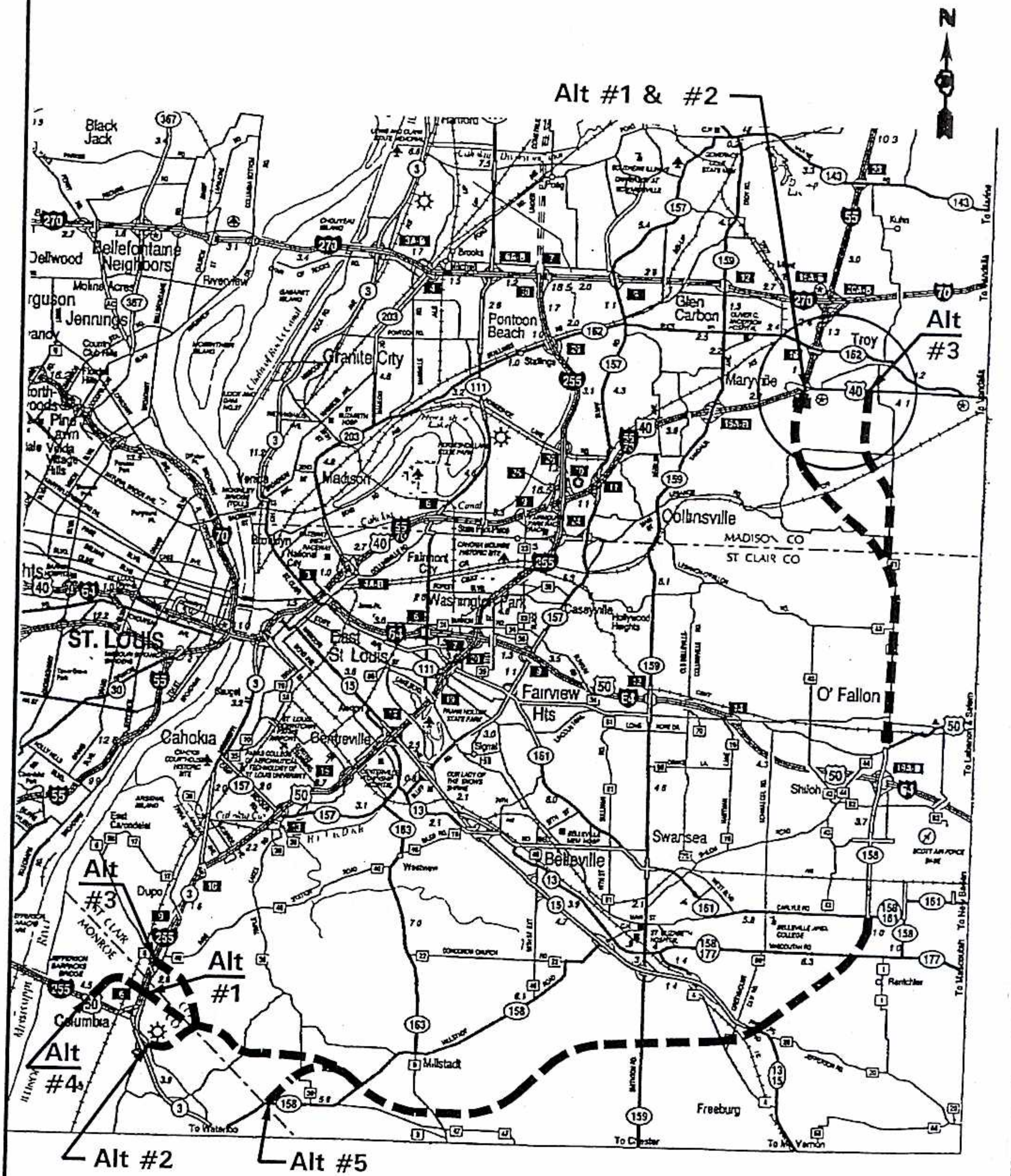
* Build Four Lanes Initially - Using Existing Roadway

**[illegible]

ILLINOIS ROUTE 158 FEASIBILITY STUDY
INTERSECTION ALTERNATE

	COSTS
<u>ROAD BRIDGES</u>	
Over Roadway:	
- Loyet Rd. (2)	$544,000
- County Line Rd. (2)	$544,000
- Plum Hill School Rd. (2)	$544,000
- Jefferson Rd. (2)	$544,000
- Country Side Lane (2)	$544,000
- Schiermeier Rd. (2)	$544,000
- Lunch Rd. (2)	$544,000
- High Prairie School Rd. (2)	$544,000
	$4,352,000
Over Waterway:	
- Ogles Creek (1)	$518,000
- Hagermann Creek (1)	$518,000
- Engle Creek (1)	$518,000
- Spring Brook Creek (1)	$518,000
- Loop Creek (2)	$1,036,000
- Loop Creek (2)	$1,036,000
- Douglas Creek (2)	$1,036,000
	$5,180,000
Over Railway:	
- Consolidated R.R. (2)	$264,000
- IL Central R.R. (2)	$162,000
	$426,000
<u>RAILROAD BRIDGES</u>	
- CSX R.R. (1)	$308,000

I-55 / I-70 / US-40
INTERCHANGE ANALYSIS



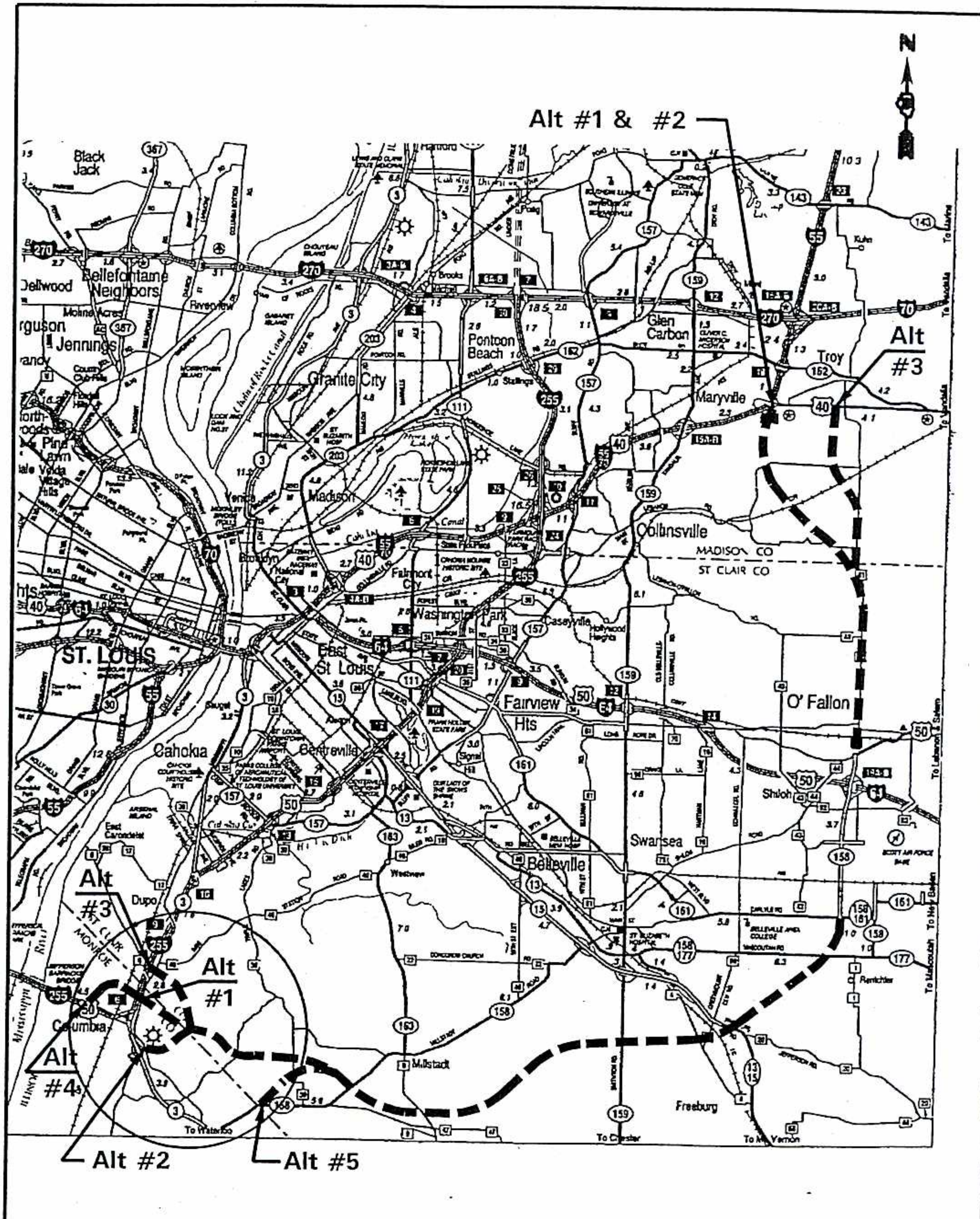
INTERCHANGE ALTERNATIVES

ILLINOIS ROUTE 158 FEASIBILITY STUDY
I-55/I-70/US-40 INTERCHANGE TYPE STUDY

	ALTERNATIVE #1	ALTERNATIVE #2	ALTERNATIVE #3 *
ROADWAY	$9,886,000	$8,169,000	$5,295,000
BRIDGES	$7,762,000	$8,588,000	$1,194,000
FRONTAGE ROADS	$1,440,000	$1,860,000	$750,000
REMOVE EXISTING RAMPS & BRIDGE	$200,000	$0	$0
Total	$19,288,000	$18,617,000	$7,239,000
Contingencies (25%)	$4,822,000	$4,654,000	$1,810,000
Construction Cost	$24,110,000	$23,271,000	$9,049,000
Preliminary Engineering & Construction Engineering (15%)	$3,617,000	$3,491,000	$1,357,000
Right-Of-Way ($4000/Acre)	$263,000	$263,000	$157,000
Utility Adjustments	$50,000	$50,000	$50,000
Construction Cost With Engineering	**$28,040,000**	**$27,075,000**	**$10,613,000**

* Cost Includes Improvements Of US-40 To I-55/I-70 Interchange And Bridge Over Formosa Road.

I-255 / US-50 / IL-3
INTERCHANGE ANALYSIS



INTERCHANGE ALTERNATIVES

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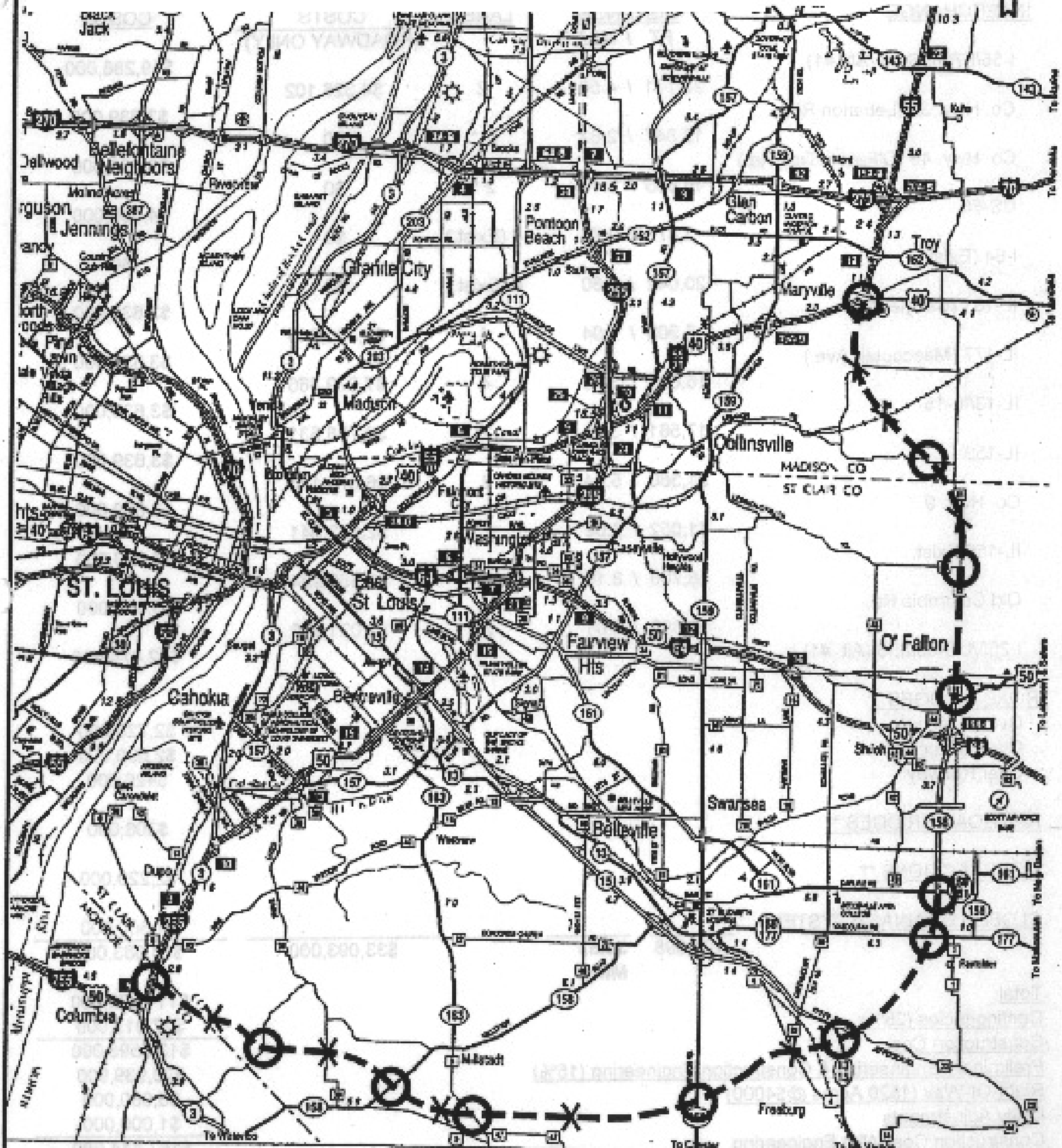
ILLINOIS ROUTE 158 FEASIBILITY STUDY
I-255/US-50/IL-3 INTERCHANGE TYPE STUDY

	ALTERNATIVE #1 (Build New Interchange)	ALTERNATIVE #2 (Utilize Quarry Rd Interchange)	ALTERNATIVE #3 (Utilize Co. Hwy 6 Bridge)	ALTERNATIVE #4 (Utilize Fish Lake Bridge)	ALTERNATIVE #5 (Utilize Exist. IL-158 Interchange)
ROADWAY	$6,273,000	$0	$2,053,000	$5,283,000 **	$0
BRIDGES	$5,801,000	$0	$532,000	$3,308,000 ***	$0
FRONTAGE ROADS	$400,000	$600,000 *	$0	$1,088,000	$300,000
Total	$12,474,000	$600,000	$2,585,000	$9,679,000	$300,000
Contingencies (25%)	$3,119,000	$150,000	$646,000	$2,420,000	$75,000
Construction Cost	$15,593,000	$750,000	$3,231,000	$12,099,000	$375,000
Preliminary Engineering & Construction Engineering (15%)	$2,339,000	$113,000	$485,000	$1,815,000	$56,000
Right-Of-Way ($4000/Acre)	$136,000	$0	$80,000	$262,000	$0
Utility Adjustments	$50,000	$50,000	$50,000	$50,000	$50,000
Construction Cost With Engineering	**$18,118,000**	**$913,000**	**$3,846,000**	**$14,226,000**	**$481,000** ****

* Quarry Road And Palmer Road Relocation
** Cost Also Includes Construction of IL-158 West of I-255 (1.44 Miles)
*** Cost Also Includes Construction of IL-158 Bridges over I-255 and IL-158 Bridges over Union Pacific R.R.
**** Additional Cost 49.7 Millions Will Be Needed to Extend IL-158 from Existing IL-3/IL-158 Interchange to Fish Lake Bridge.
This Cost Also Includes Construction of Bridges over IL-3/IL-158 Interchange, Bridges over Union Pacific R.R., and Fish Lake Interchange.

STAGING OPTIONS



PROPOSED INTERCHANGE

PROPOSED INTERSECTION

INTERCHANGE & INTERSECTION ALTERNATE

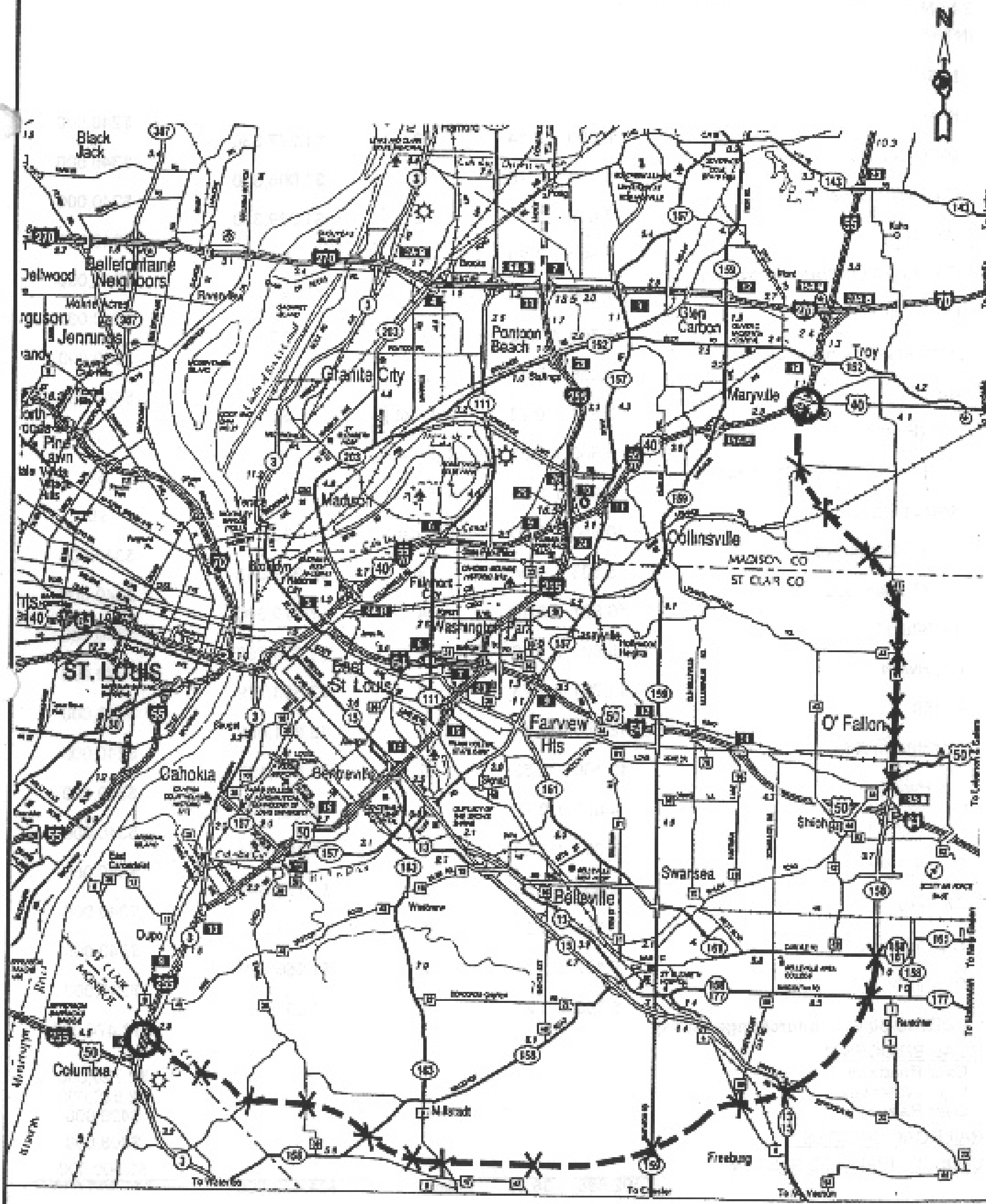
ILLINOIS ROUTE 158 FEASIBILITY STUDY
2-LANE & 4-LANE / INTERCHANGE & INTERSECTION ALTERNATE

INTERCHANGE	DISTANCE FT. / MILES	LANES	COSTS (ROADWAY ONLY)	COSTS
I-55/I-70/US-40 (Alt. #1)				$19,288,000
	23,771 / 4.50	2	$4,326,102	
Co. Hwy. 32 (Lebanon Rd.)				$3,639,000
	13,847 / 2.62	2 *	$0	
Co. Hwy. 43 (O'Fallon-Troy Rd.)				$3,639,000
	16,666 / 3.16	2 *	$0	
US-50				$4,306,000
	3,877 / 0.73	4 (Exist.)	$0	
I-64 (Exist.)				$0
	20,042 / 3.80	4 (Exist.)	$0	
IL-161 (Carlyle Rd.)				$3,639,000
	5,503 / 1.04	4	$2,343,048	
IL-177 (Mascoutah Ave.)				$3,639,000
	16,627 / 3.15	4	$7,079,386	
IL-13/IL-15				$3,639,000
	17,561 / 3.33	2	$3,738,531	
IL-159				$3,639,000
	31,360 / 5.94	2	$6,676,176	
Co. Hwy. 9				$3,639,000
	11,052 / 2.09	2	$2,352,841	
IL-158 Exist.				$3,639,000
	16,700 / 3.16	2	$3,555,234	
Old Columbia Rd.				$3,639,000
	15,892 / 3.01	2	$3,021,310	
I-255/US-50/IL-3 (Alt. #1)				$12,474,000
ROAD BRIDGES **				
Over Roadway				$2,720,000
Over Waterway				$2,590,000
Over Railway				$426,000
RAILROAD BRIDGES **				$308,000
INTERSECTIONS **				$2,220,000
CLOSED DRAINAGE SYSTEM				$1,500,000
	192,898 **36.53 Miles**		$33,093,000	$78,583,000
Total				$111,676,000
Contingencies (25%)				$27,919,000
Construction Cost				$139,595,000
Preliminary Engineering & Construction Engineering (15%)				$20,939,000
Right-Of-Way (1520 Acres @$4000)				$6,080,000
Utility Adjustments				$1,000,000
Construction Cost With Engineering				**$167,614,000**

* Using Existing Roadway
**For Locations And Costs See Page 2

ILLINOIS ROUTE 158 FEASIBILITY STUDY
INTERCHANGE & INTERSECTION ALTERNATE

		COSTS
ROAD BRIDGES		
	Over Roadway:	
	- Loyet Rd. (1)	$272,000
	- County Line Rd. (1)	$272,000
	- Plum Hill School Rd. (2)	$544,000
	- Jefferson Rd. (2)	$544,000
	- Country Side Lane (1)	$272,000
	- Schiermeier Rd. (1)	$272,000
	- Lunch Rd. (1)	$272,000
	- High Prairie School Rd. (1)	$272,000
		$2,720,000
	Over Waterway:	
	- Loop Creek (2)	$1,036,000
	- Loop Creek (2)	$1,036,000
	- Douglas Creek (1)	$518,000
		$2,590,000
	Over Railway:	
	- Consolidated R.R. (2)	$264,000
	- IL Central R.R. (2)	$162,000
		$426,000
RAILROAD BRIDGES		
	- CSX R.R. (1)	$308,000
INTERSECTIONS		
	- Kirsch Rd.	$240,000
	- Mill Creek Rd.	$240,000
	- Weil Rd.	$240,000
	- Co. Hwy. 4	$340,000
	- Roachtown Rd.	$240,000
	- Co. Hwy. 71	$340,000
	- Co. Hwy. 39	$340,000
	- Rueck Rd.	$240,000
		$2,220,000



X PROPOSED INTERSECTION

INTERSECTION ALTERNATE

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ILLINOIS ROUTE 158 FEASIBILITY STUDY

2-LANE & 4-LANE / INTERSECTION ALTERNATE

INTERSECTION	DISTANCE FT. / MILES	LANES	COSTS (ROADWAY ONLY)	COSTS
I-55/I-70/US-40 (Interchange Alt.#1)				$19,288,000
	8,350 / 1.58	2	$1,043,152	
Kirsch Rd.				$240,000
	6,000 / 1.14	2	$1,277,330	
Mill Creek Rd.				$340,000
	9,421 / 1.78	2	$2,005,620	
Co. Hwy. 32 (Lebanon Rd.)				$240,000
	7,047 / 1.33	2	$1,339,330	
Weil Rd.				$240,000
	6,800 / 1.29	2 *	$0	
Co. Hwy. 43 (O'Fallon-Troy Rd.)				$340,000
	7,300 / 1.38	2 *	$0	
Oak High School Rd.				$240,000
	5,300 / 1.00	2 *	$0	
Borchers Ln./Vincennes Tr.				$240,000
	4,066 / 0.77	2 *	$0	
US-50				$340,000
	3,877 / 0.73	4 (Exist.)	$0	
I-64 (Exist.)				$0
	4,500 / 0.85	4 (Exist.)	$0	
Co. Hwy. 82 (Maple St.) (Exist,)				$0
	4,992 / 0.95	4 (Exist.)	$0	
Seibert Rd. (Exist.)				$0
	10,550 / 2.00	4 (Exist.)	$0	
IL-161 (Carlyle Rd.)				$340,000
	5,503 / 1.04	4	$2,343,048	
IL-177 (Mascoutah Ave.)				$340,000
	16,627 / 3.15	4	$7,079,386	
IL-13/IL-15				$340,000
	5,800 / 1.10	2	$1,234,752	
Co. Hwy 4				$340,000
	11,761 / 2.23	2	$2,503,779	
IL-159				$340,000
	18,000 / 3.41	2	$3,831,989	
Roachtown Rd.				$240,000
	13,360 / 2.53	2	$2,844,187	
Co. Hwy. 9				$340,000
	4,050 / 0.77	2	$862,197	
Co. Hwy. 71				$340,000
	7,002 / 1.33	2	$1,490,644	
IL-158 Exist.				$340,000
	8,350 / 1.58	2	$1,777,617	
Co. Hwy. 39				$340,000
	8,350 / 1.58	2	$1,777,617	
Old Columbia Rd.				$240,000
	9,192 / 1.74	2	$1,956,869	
Rueck Rd.				$240,000
	6,700 / 1.27	2	$1,064,441	
I-255/US-50/IL-3 (Interchange Alt.#1)				$12,474,000
ROAD BRIDGES **				
Over Roadway				$2,720,000
Over Waterway				$2,590,000
Over Railway				$426,000
RAILROAD BRIDGES **				$308,000
CLOSED DRAINAGE SYSTEM				$1,500,000
	192,898 **36.53**	**Miles**	$34,432,000	$45,306,000
Total				$79,738,000
Contingencies (25%)				$19,935,000
Construction Cost				$99,673,000
Preliminary Engineering & Construction Engineering (15%)				$14,951,000
Right-Of-Way (1206 Acres @$4000)				$4,824,000
Utility Adjustments				$1,000,000
Construction Cost With Engineering				**$120,448,000**

* Using Existing Roadway

**For Locations And Costs See Page 2

ILLINOIS ROUTE 158 FEASIBILITY STUDY
INTERSECTION ALTERNATE

	COSTS
ROAD BRIDGES	
Over Roadway:	
- Loyet Rd. (1)	$272,000
- County Line Rd. (1)	$272,000
- Plum Hill School Rd. (2)	$544,000
- Jefferson Rd. (2)	$544,000
- Country Side Lane (1)	$272,000
- Schiermeier Rd. (1)	$272,000
- Lunch Rd. (1)	$272,000
- High Prairie School Rd. (1)	$272,000
	$2,720,000
Over Waterway:	
- Loop Creek (2)	$1,036,000
- Loop Creek (2)	$1,036,000
- Douglas Creek (1)	$518,000
	$2,590,000
Over Railway:	
- Consolidated R.R. (2)	$264,000
- IL Central R.R. (2)	$162,000
	$426,000
RAILROAD BRIDGES	
- CSX R.R. (1)	$308,000

Illinois Department of Transportation

Division of Highways / District 8
1102 Eastport Plaza Drive / Collinsville, Illinois / 62234-6198

December 21, 2001

Mr. Ronald A. Shimizu, P.E.
Parsons, Brinckerhoff, Quade, and Douglas, Inc.
230 West Monroe Street
Suite 350
Chicago, IL 60606-4701

Dear Mr. Shimizu:

The District has reviewed the preliminary final report on the Illinois 158 Outer Belt Feasibility Study. We concur with your recommendations and conclusions.

The District's Programming Unit has calculated estimated costs for the construction of the outer belt based on recent lettings. We feel a more appropriate estimated cost for the interchange alternative to be nearly $400 million in current dollars. Additionally, the intersection alternative is estimated to cost nearly $325 million in current dollars, with the combination alternative somewhere in between. These costs were based on similar types of projects the District has recently completed.

We request this letter to be included in the final report. Should you have any questions regarding these costs, please contact Mrs. Cindy Watters, our Programming Engineer at (618) 346-3150.

Sincerely,

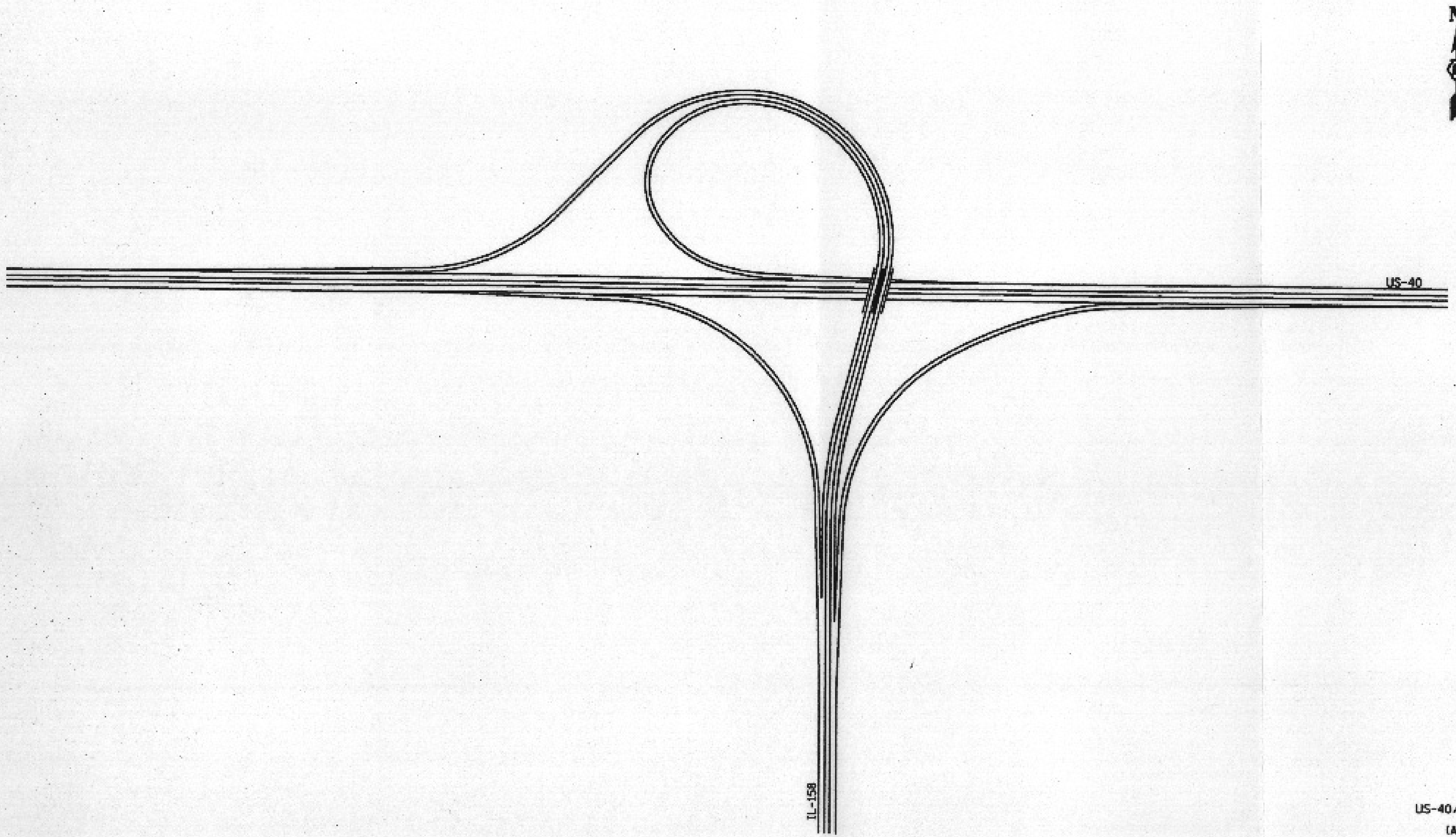
James L. Easterly, P.E.
District Engineer

Mary C. Lamie

Mary C. Lamie
Program Development Engineer

RT:jcp/IL 158 Outer Belt Feasibility Study Shimizu

cc: Mr. Mike Williamsen Attn.: Mr. Steve Baker



US-40/IL-158 INTERCHANGE
(ALTERNATIVE #3)

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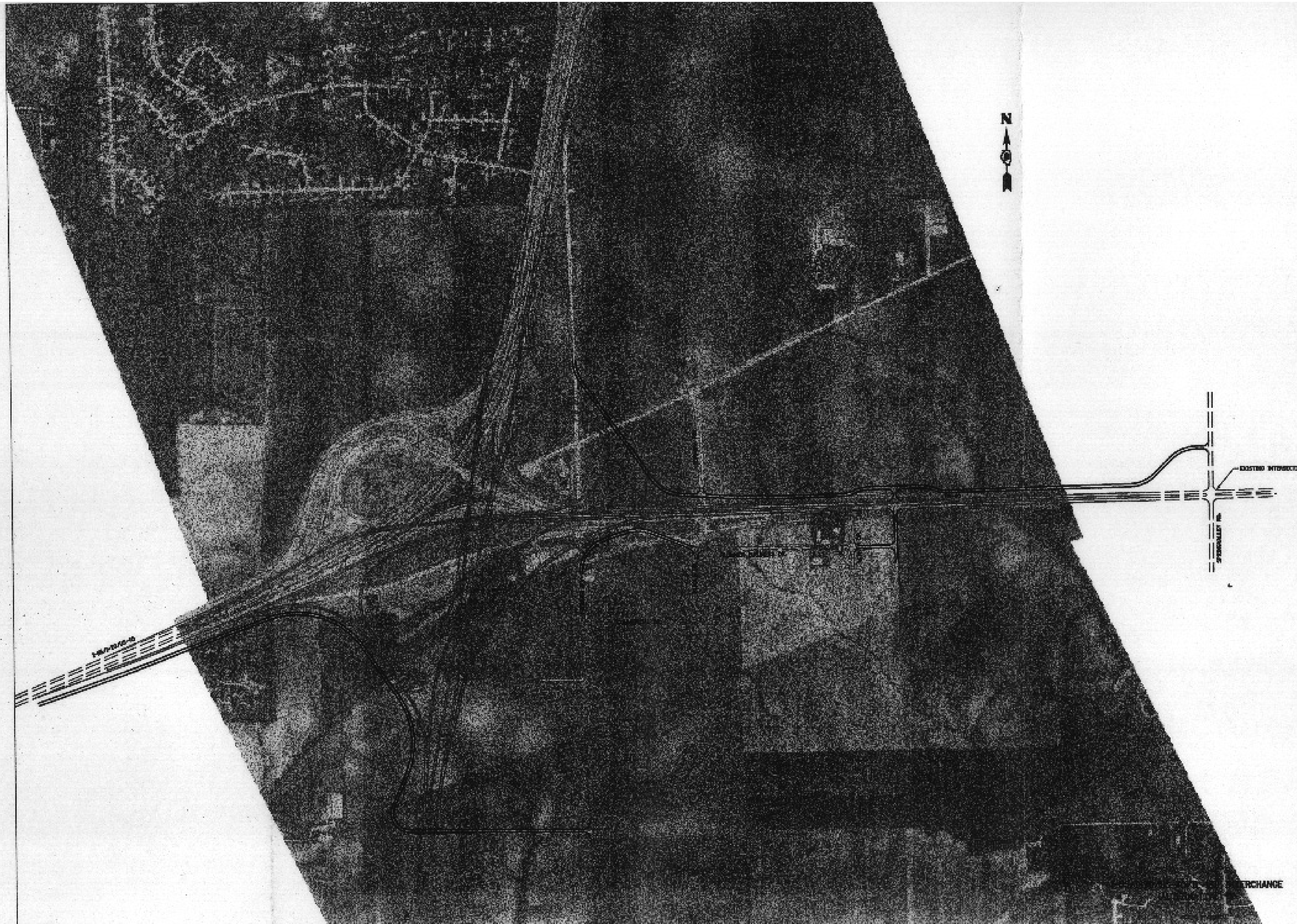
N
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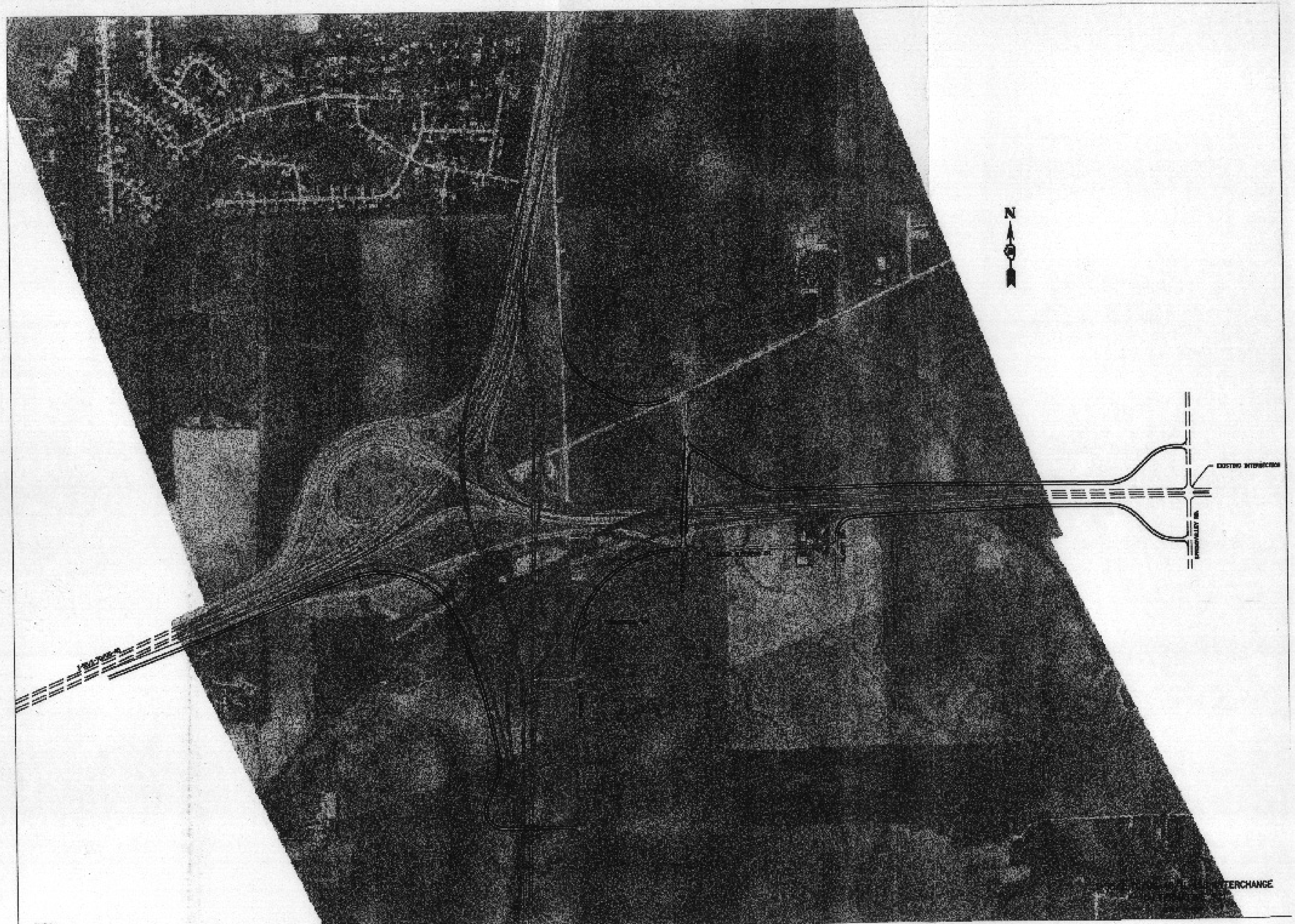
INTERCHANGE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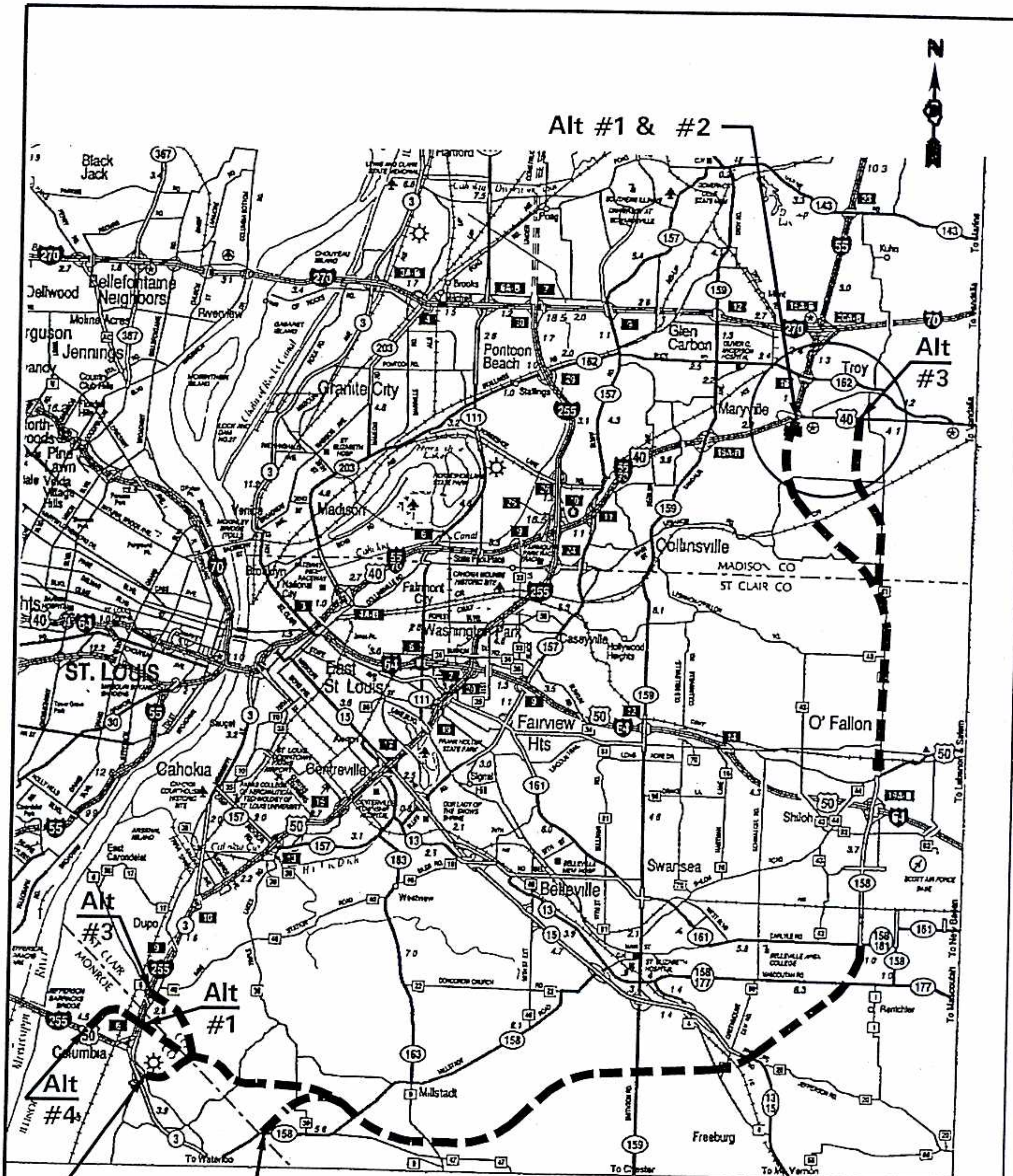
EXISTING INTERSECTION
INTERCHANGE

ILLINOIS ROUTE 158 FEASIBILITY STUDY
I-55/I-70/US-40 INTERCHANGE TYPE STUDY

PLUSES	MINUSES
Interchange Alternative #1:	
- Route I-55/I-70 continuity provided. - I-55/I-70 mainline will remain in place. - Single-exit design provided on I-55/I-70. - All right-hand ramps. - US-40 access to frontage roads will be provided at new intersection.	- Removal of all ramps and bridge. - Exit to US-40 will be closed during construction. - High cost of construction ($28M)
Interchange Alternative #2:	
- Route I-55/I-70 continuity provided. - I-55/I-70 mainline will remain in place. - Ramp N-E and ramp E-W, and bridge over I-55/I-70 will remain. - All right-hand ramps. - Less cost ($27M) than cost of Alt. #1.	- Inconsistent pattern of exits for I-55/I-70 SB. - I-55/I-70 SB with two-exit design and NB with single-exit design. - US-40 access to frontage roads will utilize existing Springvalley Road intersection.
Interchange Alternative #3:	
- No work will proceed at I-55/I-70/US-40 Interchange. - Low cost of construction ($11M)	- Motorists will need to use US-40 to get on IL-158. (Still freeway to freeway connection)



INTERCHANGE ALTERNATIVES

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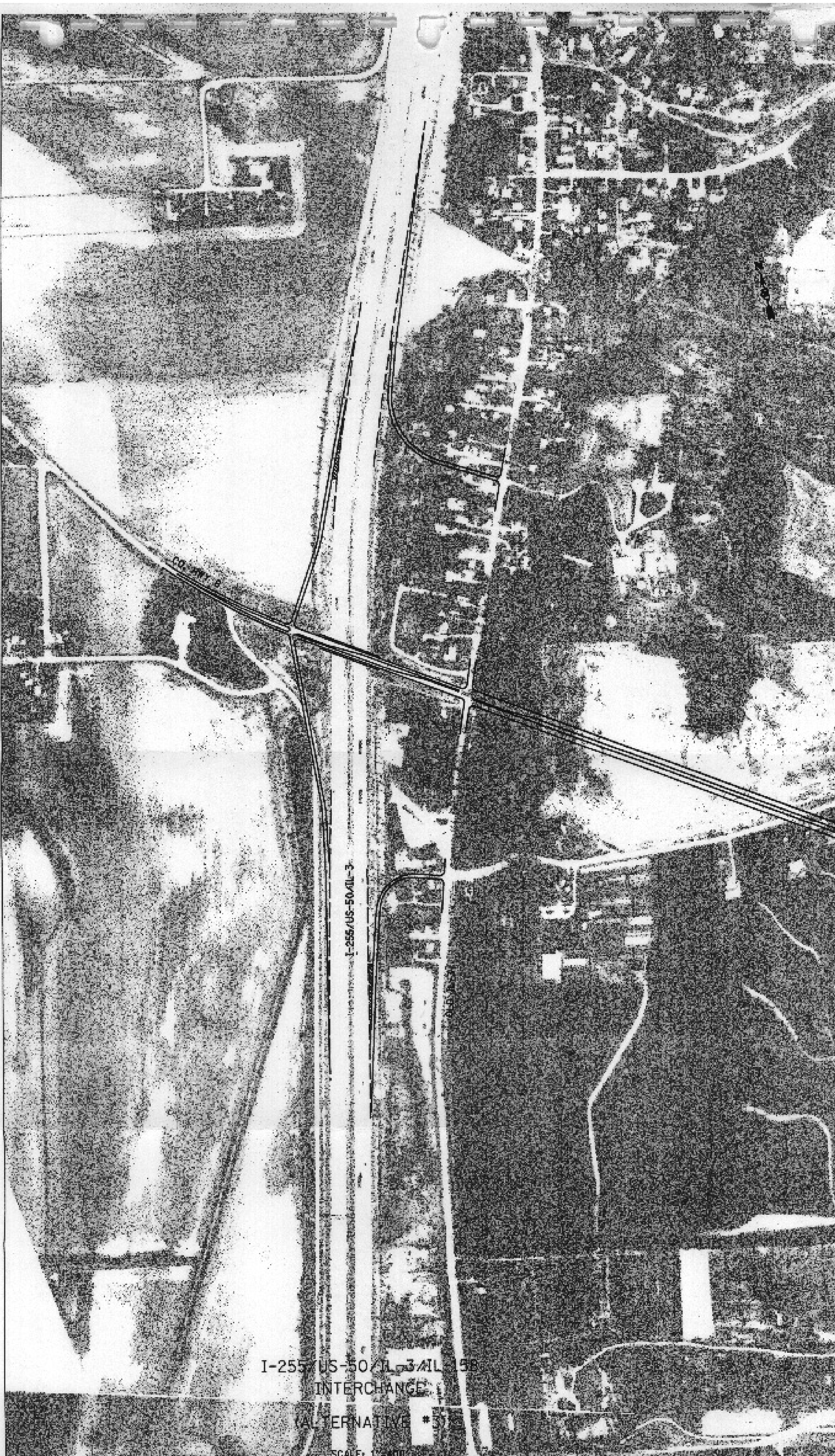

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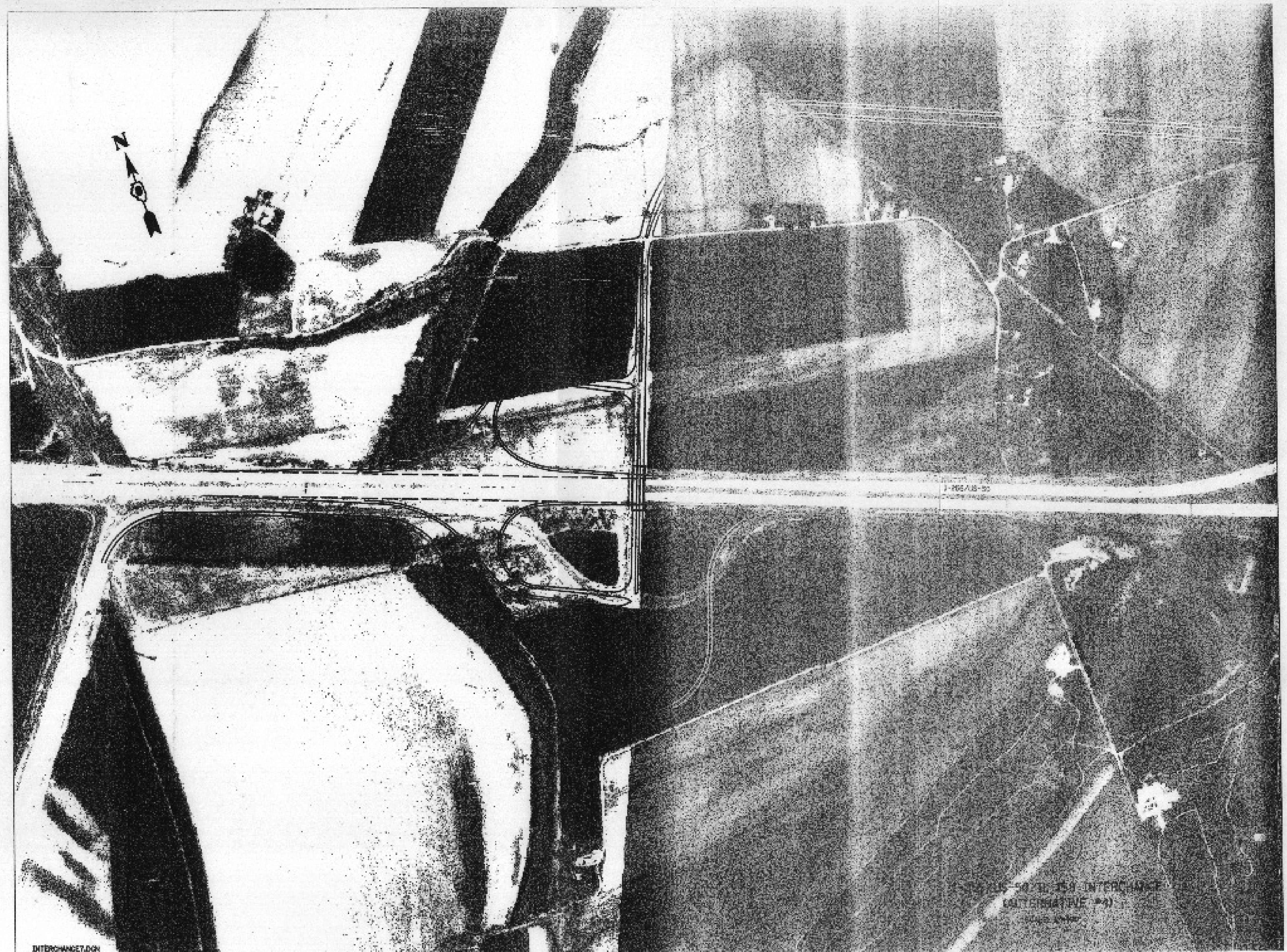

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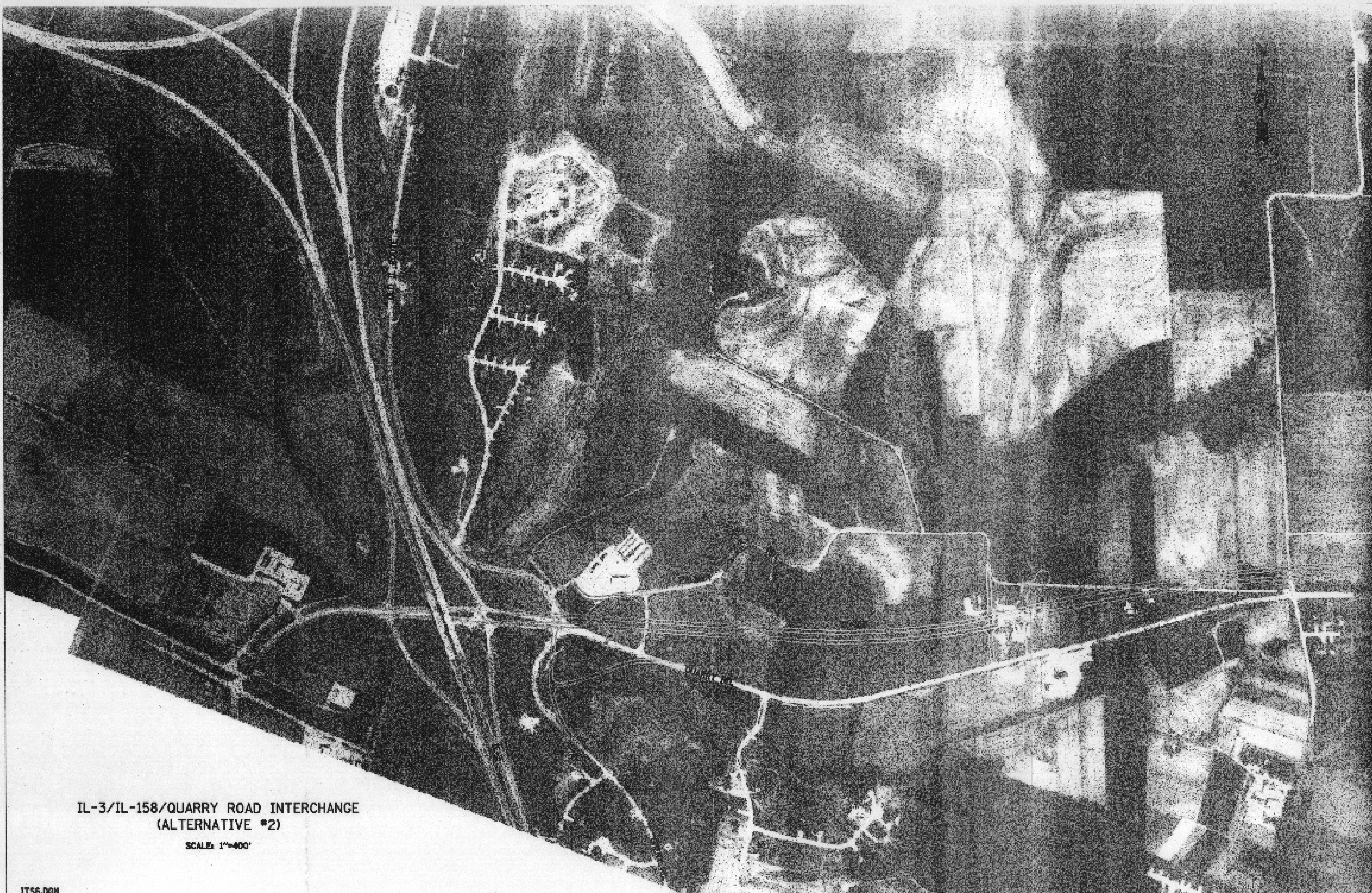

IL-3/IL-158/QUARRY ROAD INTERCHANGE
(ALTERNATIVE #2)

SCALE: 1"=400'

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A.4 TRAVEL DEMAND FORECASTS

A.4 TRAVEL DEMAND FORECASTS

For estimating future travel demand for the proposed IL-158 Outer Belt facility for this study, East-West Gateway Coordinating Council's (EWGCC) travel demand forecasting model was used. Parsons Brinckerhoff (PB) obtained the model from EWGCC in the summer of 2000. The EWGCC travel demand model is implemented using the MINUTP travel demand forecasting software. Documentation of the travel demand forecasting model can be obtained from EWGCC.

To develop the preliminary traffic forecasts for the initial alternatives, PB coded the proposed alternatives, following EWGCC highway network coding conventions. 2020 traffic forecasts were developed using EWGCC travel demand model, using 2020 model inputs supplied by EWGCC.

PB developed more refined traffic forecasts for the final alternative. Several of the larger transportation analysis zones (TAZs) in the corridor were disaggregated to improve the traffic assignment process. The TAZs were disaggregated based upon available local data. However, trip end totals for the new disaggregated TAZs still reflected total trip ends of the original EWGCC TAZ. The TAZs that were disaggregated included:

- TAZ 846
- TAZ 910
- TAZ 913
- TAZ 915
- TAZ 958
- TAZ 964
- TAZ 967
- TAZ 979
- TAZ 982